



MASTERS IN 3D METAL PRINTING

# METAL PRINTING SOLUTIONS



*Author:*

**Jaap Bulsink**

CTO  
at K3D

## Expertise and capacity

K3D is a 1-stop-shop for 3D metal printing, operating from two centers in the Netherlands. The first MetalFAB1 was purchased in 2016 for the headquarters in Terborg. Terborg is located in a region with a long history in manufacturing metal and machinery. Until this day, more than 95.000 industrial applications have been printed with this industrial 3D metal printer. A second location was opened in Eindhoven, in 2018, with the same printer. Both printers are able to produce parts up to 420 x 420 x 400 mm. As a result, our services are applicable to specific target markets, such as the aircraft industry, oil and gas industry, medical supply and sales, food tech and high tech industry.

The centers in Terborg and Eindhoven offer businesses knowledge, capacity and assistance in the design and manufacturing process. This unique support enables you to utilize the benefits of 3D metal printing to its fullest potential. In addition to printing 3D products, K3D can assist you in developing your business cases and they offer training programs. The 3D printed parts can be used on their own, implemented in prototypes or used as full-fledged parts in different machines.

## Local production

One of the goals of K3D is to create print hubs on, or nearby, production locations. This ensures fast and easy access to printed parts for their customers, without loss of quality. By implementing these hubs, the need for transport is greatly reduced. Additionally, it empowers local communities by creating employment opportunities.

Another goal of K3D is to instill an innovative way of working in the companies of their customers. For example, they have integrated 3D printed parts in the traditional design of

various bakery machines. By doing this, the use of raw materials was reduced and the functionality improved because of the new design. The possibilities of 3D metal printing are endless. Parts that previously had to be assembled can now be printed as a whole. For example, hinges, leaf-springs and bearings. Materials can even be given completely different properties, such as the porous material for the bakery industry, which K3D developed. This material stays clean while cutting dough, when air is blown through.

## High-tech developments

3D metal printing is a development in itself. However, developments never stand on their own. Therefore K3D tries to stay on top of innovations and developments in various branches. Digitalization and automatization are very important to be able to produce parts fast and with a constant quality. These developments are necessary to take K3D to the next level: local production.

## Partnerships

K3D has set up various partnerships with leading companies and educational institutes to share and acquire knowledge. One of these collaborations is K3D-AddFab. Located mainly in the south of the Netherlands, K3D-AddFab is a print and expertise center, with state-of-the-art machines and facilities, where further steps in the industrialization of 3D metal printing will be achieved through an innovation program in the aforementioned areas. K3D works with participating companies and educational institutions to advance the 3D metal printing technology. K3D-AddFab's ambition is to further develop a wide range of high-tech and high-end production applications for 3D metal printing, for industrial series production and to upscale the capacity for high-quality applications.



▲ *The MetalFAB1 printer has two print cores and storage allowing to use multiple material continuous production.*

The collaboration is an example of open innovative partnership and knowledge enhancement in the field of next-generation printed metal products. This expertise is brought together in the new center on the Brainport Industries Campus in Eindhoven.

### **Impact on the region**

K3D has made a big impact on various regions throughout the Netherlands. Since the start of K3D there is a visible growth in the market of 3D metal printing. Many businesses have been implementing printed parts in their day-to-day production methods and activities. K3D helped and guided many companies on their way to realize this.

Next to this, a lot of employment opportunities have been created by K3D. With the rising demand, there is a good chance that the amount of opportunities will increase even more in the future. Additionally, K3D works together with local educational institutions and universities. This is not only to make production technique known to students, but also to help these students to gain experience in the field of 3D metal printing. Throughout the years, K3D has been supervising a lot of interns and there are many more to come.



MASTERS IN 3D METAL PRINTING

# NO MORE PANCAKE WASTE!

## HOW K3D TRANSFORMED BAKERY PRODUCTION LINES

Baking pancakes can be a messy business. K3D discovered this challenge when pancake lifters used to make 20,000 pancakes per hour needed to be optimized. The traditional design used in these lines faced issues with waste. The pancake-making process began as pancake batter was baked on a large plate in an industrial oven. But upon removing the pancakes from the baking plate, the lifting device would regularly get clogged up with the sticky batter.

### The issue

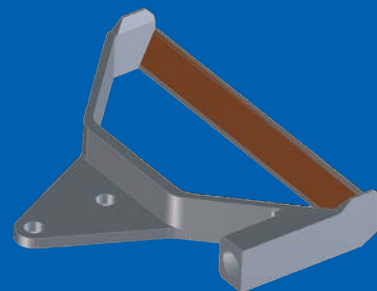
This issue in the line led to a few other bumps in the road. Firstly, it resulted in major product waste. Any pancakes that stuck to the lifter would no longer meet the quality requirements and therefore would need to be removed. Secondly, all the waste build-up caused postponements in the production line. The stuck batter dirtied the machines, resulting in teams stopping the entire line to clean them. The delays and excess waste meant that this process needed a serious boost in efficiency.



### The result

After completing the process of determining the optimal parameters and redesigning the part, the K3D had a 3D-printed design to combat the stickiness experienced in the production line. The new design is one complete part featuring internal channels and porous metal parts that allow airflow. This air is pushed into the lifter and blows out of its pores. The pancakes can then hover above the lifter, much like a hovercraft over water.

The team also used this redesign to reduce the amount of material needed. 3D printing allows for integrated, organic forms that, with the right know-how behind it, means improvements such as this can be made. Less material benefited the project in multiple ways, including reducing material costs and accelerating machine build time.



“ Now, each production line is seeing a reduction in pancake waste by thousands of kilograms as well as a 10% increase in productivity. Just imagine how much more we can achieve with 3D printing. ”

**Jaap Bulsink**  
CTO  
K3D