

# Clever combination: Save valuable seconds with LMF and LMD

Since as early as 2006, Procter & Gamble has been using the powder-bed-based process laser metal fusion (LMF) as well as laser metal deposition (LMD) in tool production and maintenance. Klaus Eimann, head of the group for additive manufacturing methods, and his team were now able to reduce the cycle time of the production by seven seconds through the combination of the two processes.



## Procter & Gamble

[www.oralb.de](http://www.oralb.de)

The US group Procter & Gamble sells various dental care products under the brand name of Oral-B. The electric toothbrushes of the same name are available in any drugstore. Around 100,000 items leave the Procter & Gamble plant in Marktheidenfeld each day. In order for the production to be able to maintain this speed, the company's engineers have to use lots of high-tech solutions, even in small, supposedly simple components. By using the additive technology, Procter & Gamble are pioneers when it comes to highly effective production of dental care products.

EMPLOYEES

INDUSTRY  
FMCG

SALES

### APPLICATIONS

- Additive manufacturing: Laser metal fusion (LMF)
- Additive manufacturing: Laser metal deposition (LMD)

### PRODUKTE

- TrumaForm
- TruPulse
- TruDisk
- TruMark

### Challenges

Procter & Gamble wanted to optimize the production of its Oral-B toothbrush. In specific, in this case there is an approximately eight-centimeter-long steel pin which is integrated into the injection molding tool. It shapes the plastic profile that the brush has later. One problem was that the steel pin only cooled off relatively slowly. Once the plastic touched the steel, there was not sufficient heat dissipation. The consequence of this was that the injected plastic deformed, which resulted in a large number of rejects.

## Solutions

With the support of the TruPrint experts from TRUMPF, Klaus Eimann and his team for additive manufacturing methods at Procter & Gamble came upon an unusual but efficient solution. Not just one, but two additive manufacturing technologies reduce the cycle time by seven seconds through a clever combination. The number of rejects has also reduced to a few per each thousand.

## Implementation

The tool experts initially concentrated on the benefits that LMF offers: Complex internal structures. They built up the steel pin and introduced highly efficient spiral cooling into the small part of just twelve millimeters in diameter. Tests showed that the channels flushed with cooling water increased the heat conductivity of the steel pin by ten times. This still was not enough. The breakthrough came when laser metal deposition was brought into the equation. The experts placed the copper pin into the additively manufactured steel mold pin. In order to ensure a stable and seamless connection, they then covered both with tool steel using laser metal deposition. The result was a firmly bonded connection from one mold.

## Forecast

The additive manufacturing specialist team around Klaus Eimann will continue to concentrate on getting the best out of the two additive technologies – laser metal fusion and laser metal deposition. With their edge when it comes to expertise, Procter & Gamble already plays a leading role in their industry when it comes to this field.

