CASE STUDY

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adhesives, coatings, sealants & equipment
for your manufacturing and technology applications

THINKY ARM-310 Engineering Compounds Mixer
Industrial non-contact "planetary" mixer

Customer

Institute for Strategic Technology and Precious Metals (STI), Pforzheim University

Customer benefits

- Consistently mixed metal powder and polymer binder
- Powder agglomerates prevented
- Repeatable, controllable process

Production of a homogeneous feedstock for LMM 3D printing process

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Lithography-based metal manufacturing (LMM) is a novel indirect additive manufacturing process. The process is based on a step-curing process similar to stereolithography, building green metal parts from a photopolymer mixture.

The print material (feedstock) is a combination of metal powder and photosensitive polymer binder, which has a very high viscosity. During the print process, layers of the feedstock are selectively cured using UV light. The gradual lowering of the construction platform layer by layer results in a three-dimensional green part, albeit still a complete block of material. This part has enough structural integrity to move on to a two-stage final process.

Firstly, the uncured material is heated up, liquefied, and removed. The part is then sintered to form a non-porous, metallic component with good geometrical accuracy and very low surface roughness.

The feedstock, the mixture of metal powder and polymer binder, is critical in forming components with the highest precision and surface quality. It needs to be fully mixed for a reliable, high quality printing process. The **THINKY ARM-310 mixing machine** is used to ensure the consistent homogeneous mixing. It uses a planetary centrifugal motion (a mix of high-speed rotation and revolution) of the mixing container, which effects the mix with no blades or rollers, despite the high viscosity. Figure 2 shows the components necessary for the production of feedstock.

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Figure 2: Components for feedstock production

In preparation for the mixing process, the wax-like polymer binder is heated to melting point. This is then added to the mixing cup in a ratio suitable for the process. Experience has shown that it is beneficial to place the binder into the mixing container first, and then the powder. This prevents powder agglomerates from forming on the bottom of the cup.

THINKY ARM-310 Engineering Compounds Mixer

- Fast mixing
- Mix in your own product container
- Non-invasive
- From low viscosity to semi-solid materials
- Dry particle mixing
- Processes from 0.5ml
- Hands-free processing
- Consistent quality with all digital controls

Applications include: Formulating and mixing a multitude of different products including, adhesives, sealants, moulding compounds, lubricants, cosmetics and pharmaceuticals or any other materials which are hard to mix, hard to degas, or hard to wet.

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