

Process chain for the manufacture of hybrid medical devices

Medical injection vials are usually sealed with so-called crimp caps, whose aluminum component ensures a permanent seal. A pressed-on plastic component makes it easy to open the vial. Currently, both components are produced in separate manufacturing processes and then pressed together.

Shorter production chain

To shorten the production chain, Fraunhofer ILT has integrated a roll-to-roll setup into a laser system, which guides an aluminum strip through the processing area of the laser. Laser cutting and laser structuring are combined to create a surface structure and a predetermined breaking point. The metal blanks are then removed by a robot and inserted into an injection molding machine. The crimped caps are finalized in a combined deep-drawing and back-injection process.

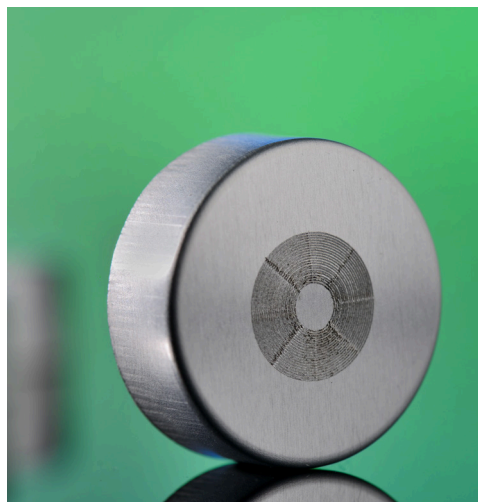
The MeKuMed project

As part of the MeKuMed project, Fraunhofer ILT shows that – by varying the laser parameters and the structure arrangement – defined pull-off forces can be achieved for opening the crimped cap in order to simplify handling and ensure tight sealing. Automated sheet metal processing by laser and the use of a combination tool in the injection molding machine can simplify the process chain and shorten process times.

The MeKuMed project aims to demonstrate that metal-plastic hybrid compounds using laser structuring can be used in the field of medical technology. In addition to Fraunhofer ILT, the following project partners are involved: KraussMaffei Technologies GmbH (project coordinator), the Chair of Plastics Processing at RWTH Aachen University, Röchling Medical Solutions SE, SimpaTec GmbH, Pulsar Photonics GmbH and Siegfried Hofmann GmbH.

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1 Process steps from sheet metal for the flared cap.
2 Laser structured flare cap.