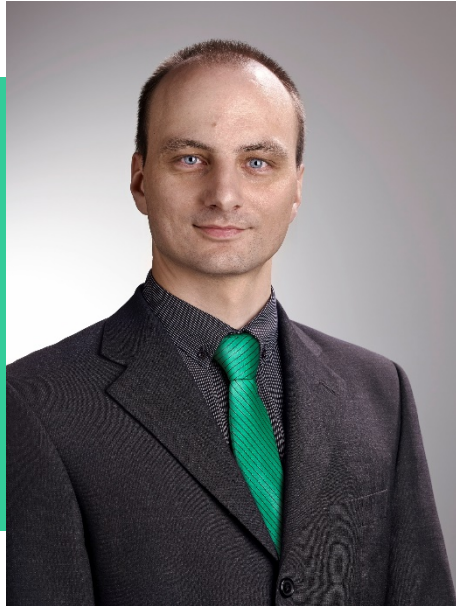


freeformer 200-3X: our standard system with two discharge units.



freeformer 300-3X: our variant with a 50 percent larger build chamber and up to three discharge units.



# **MAREK ZLOCH**

**MANAGER ADDITIVE MANUFACTURING**



[www.arburg.com](http://www.arburg.com)

*A German family-owned company, Arburg is one of the leading global manufacturers of plastic processing machines.*

*Arburg is represented by fully owned organisations at 33 locations in 25 countries and by trading partners in more than 50 countries.*

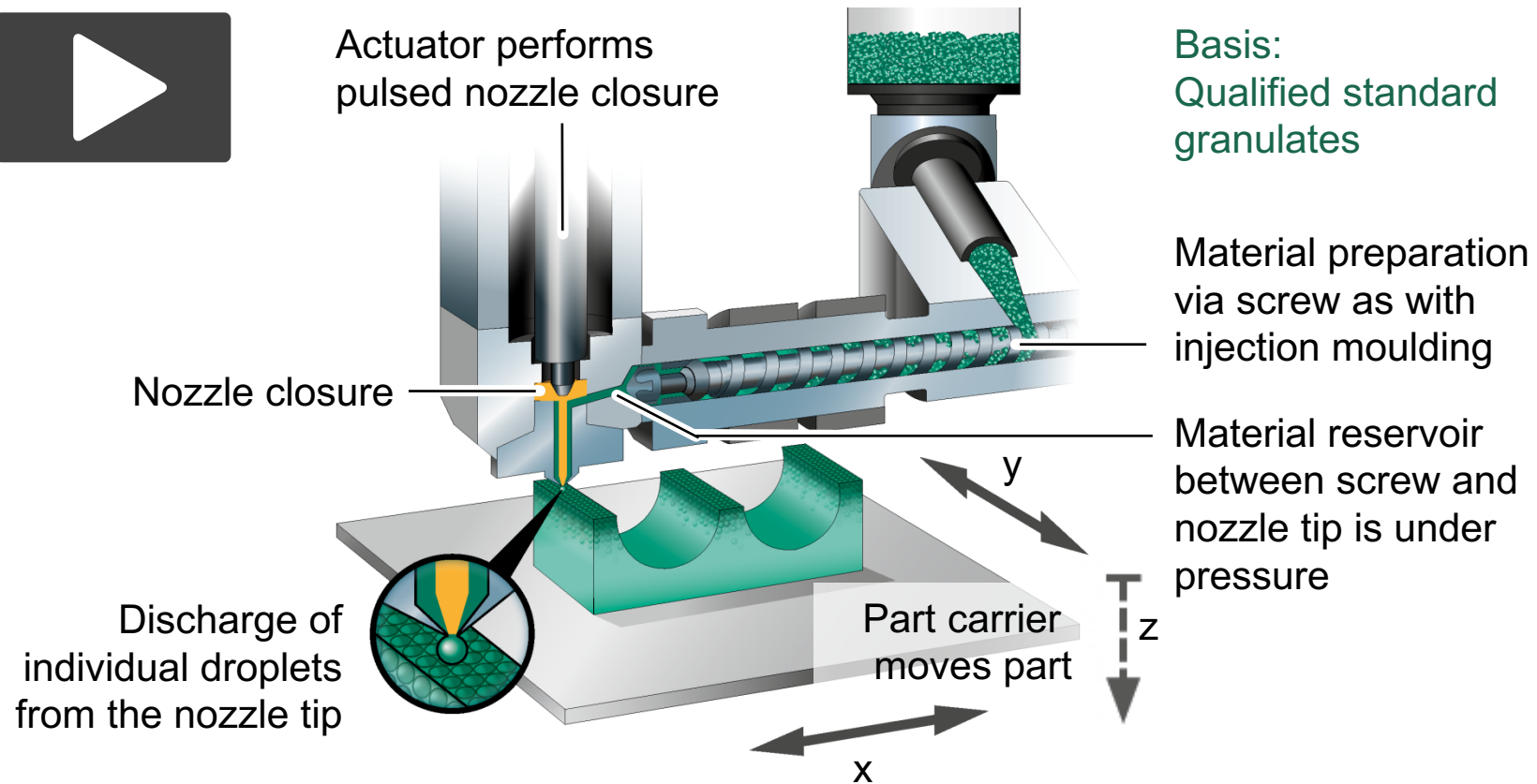
*The machines are produced exclusively at the parent company in Lossburg, Germany.*

*Of a total of around 3,000 employees, about 2,500 work in Germany. About 500 further employees work in Arburg's organizations around the world.*



# ARBURG PLASTIC FREEFORMING

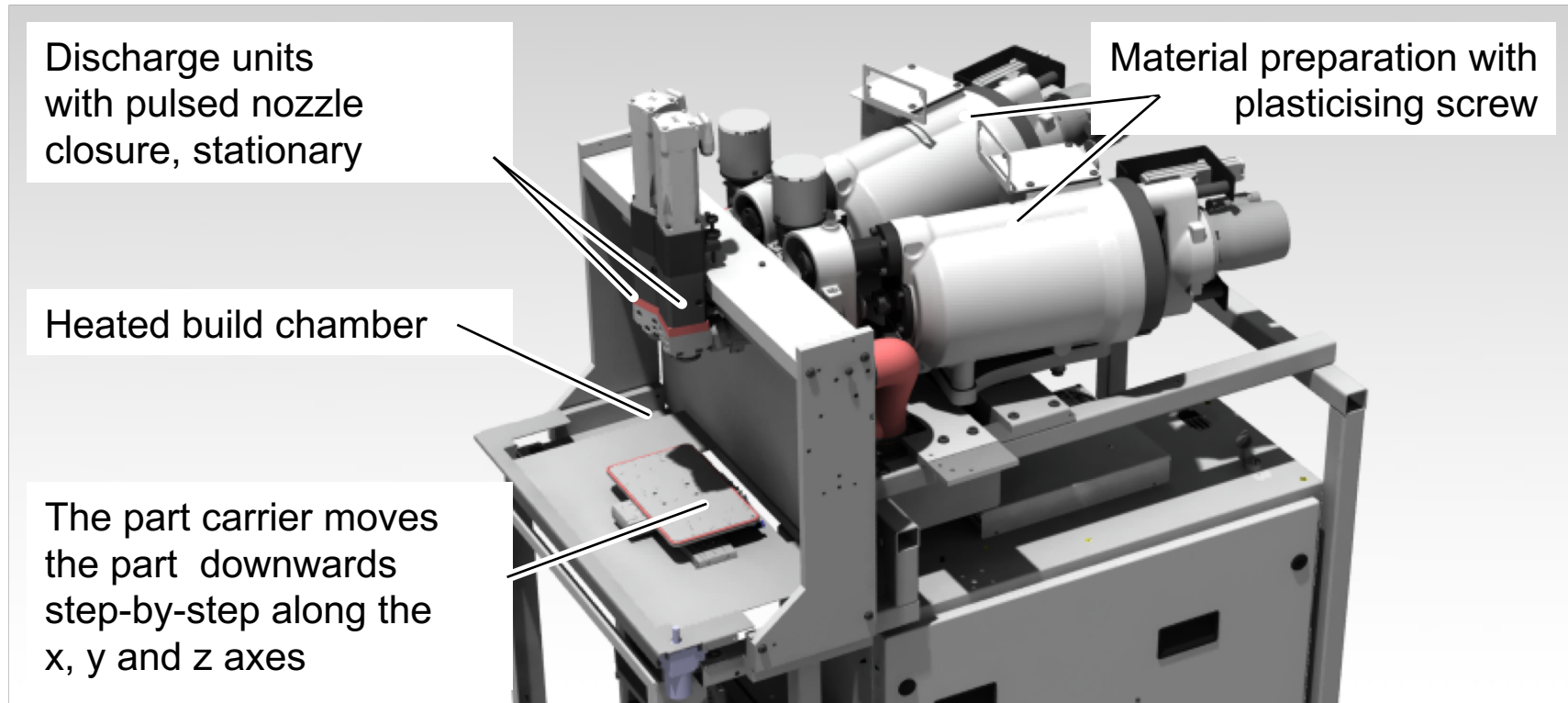
Process principle in detail





# FREEFORMER TECHNOLOGY

## Principle system components



# FREEFORMER 300 3X



# FREEFORMER TECHNOLOGY

Material preparation as for injection moulding

High availability  
of inexpensive  
standard granulates

- Use of qualified original materials
- Self-dyeing via masterbatch
- Drying required, depending on the material



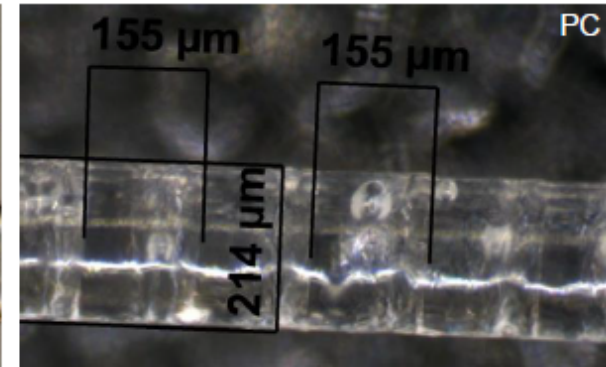
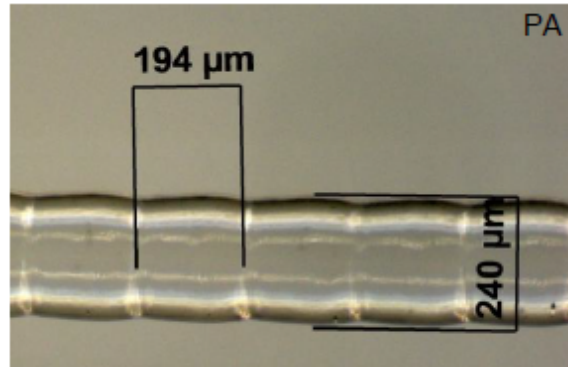
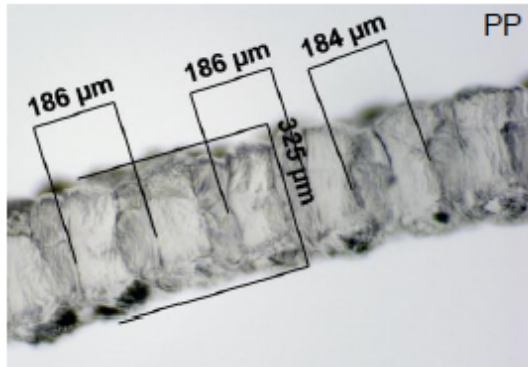
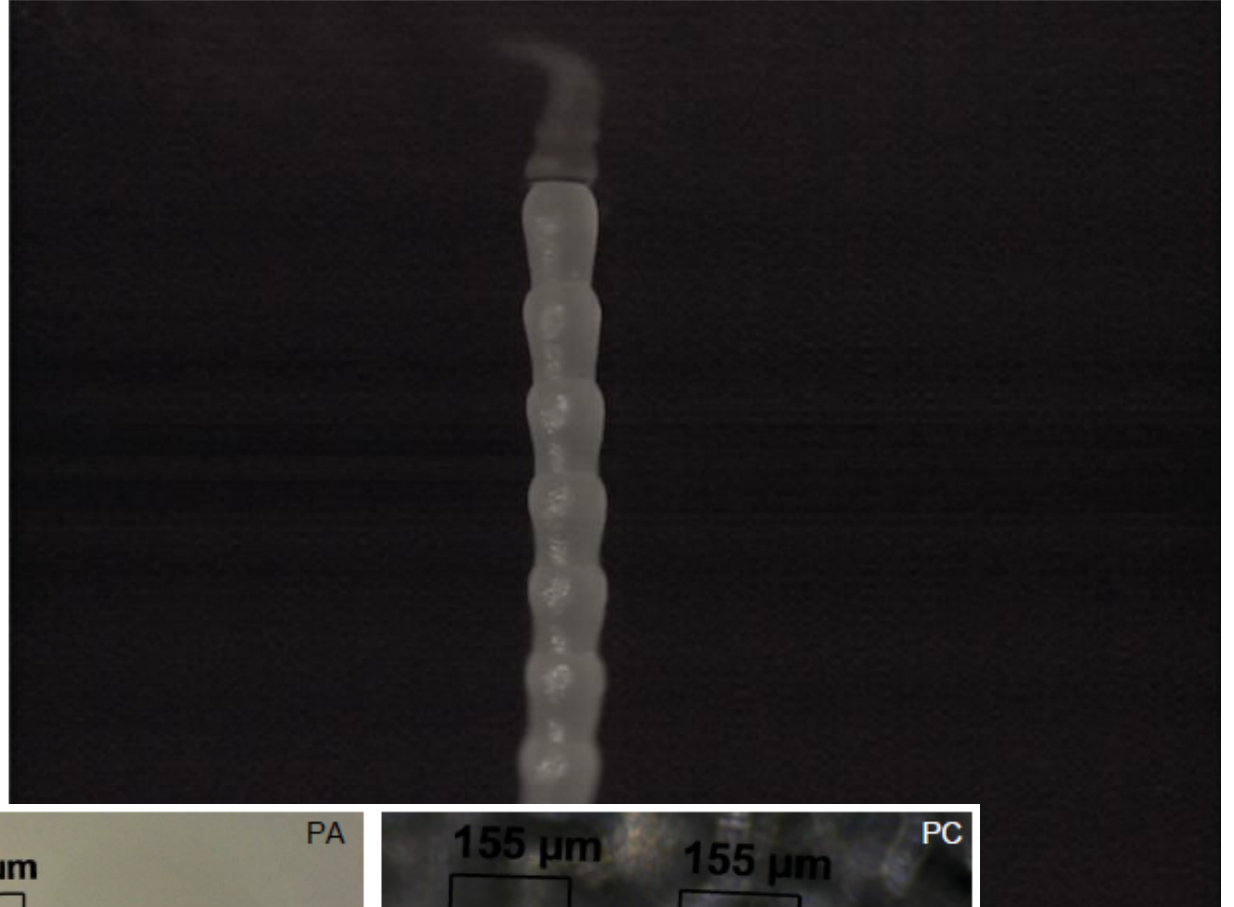


# OPEN SYSTEM – SETTING OPTIONS

Material-dependent machine parameters

- Cylinder and nozzle temperature
- Build chamber temperature
- Material discharge per drop
- Plasticizing parameters
  - Material cushion
  - Dosing speed
  - Back pressure
  - Decompression
  - ...





# CABLE FASTENER

Delicate structures with click function

*Material: PP Braskem CP 393*

- Partially crystalline plastic
- Moving functional geometry
- High geometric precision – typical injection-moulded "click"





# LED CONNECTOR

Conducting material

*Material: PC-ABS filled with carbon nanotubes (CNTs)*

- Customer-specific material compound
- Fraunhofer ICT research project
- Direct contact with a manually inserted LED



# DEFLECTION ROLLER

Moving component produced without assembly

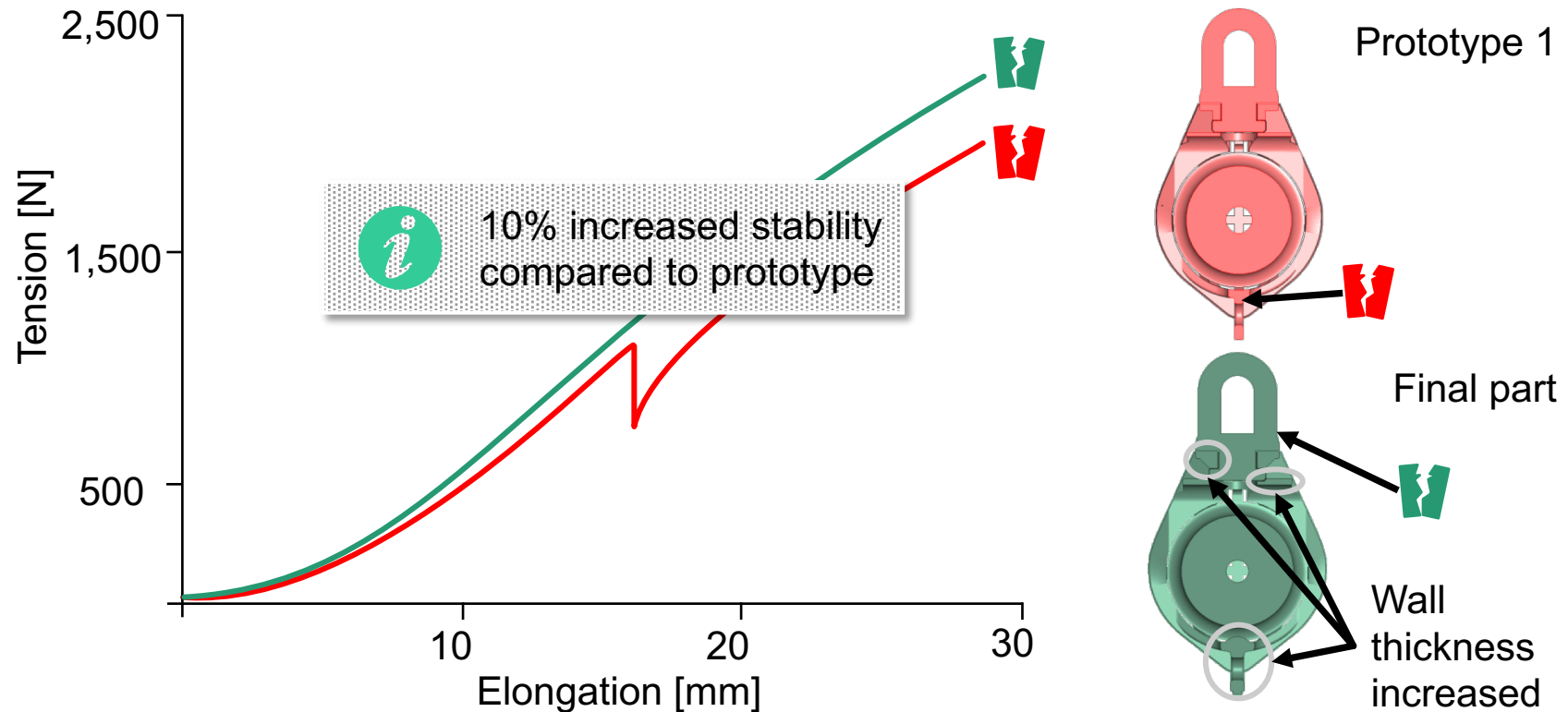
*Material: PA Grilamid XE 4010*

- Housing and fastening hook made in a single step
- Gap dimensions/sizes can be adjusted by means of the layer thickness of the support material
- Robust functional part
- Chemically resistant plastic with outstanding durability



# PART – ANALYSES AND EXAMPLE

Systematic tests lead to optimal part



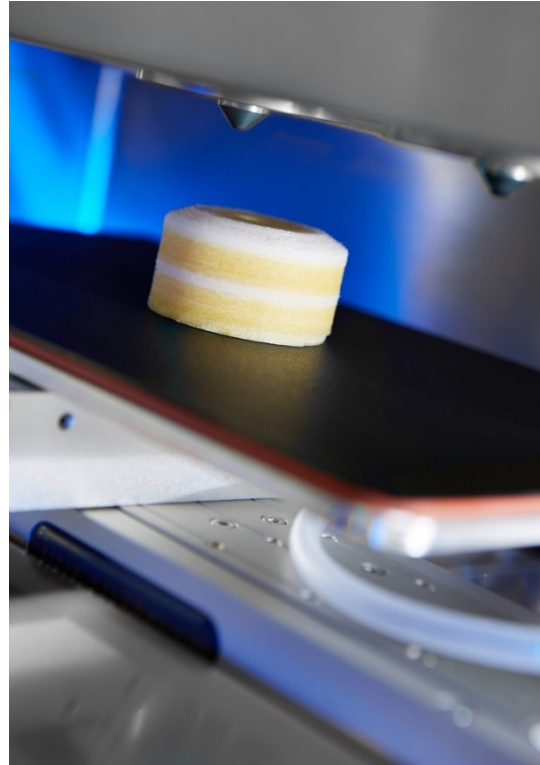


# BELLOWS

Elastic, reversible, tear-resistant and impermeable

*Material: TPU  
Elastollan C78A  
(80 Shore A)*

- Used in sealing and vacuum technology
- Additive manufacturing allows any part geometry to be produced in single-unit batches

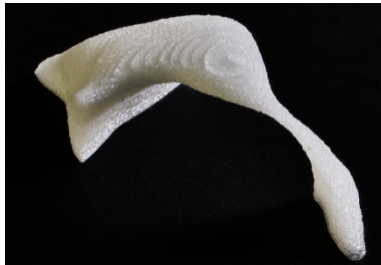


# CRANIAL BONES AND CHEEKBONES

Resorbable implants

*Materials: Purasorb PL 18  
and Resomer LR 708*

- Plastics made from medical grade polylactide (PLA) dissolve in the body in a defined way
- Gentle processing to ensure resorbability
- Adjustable surface roughness

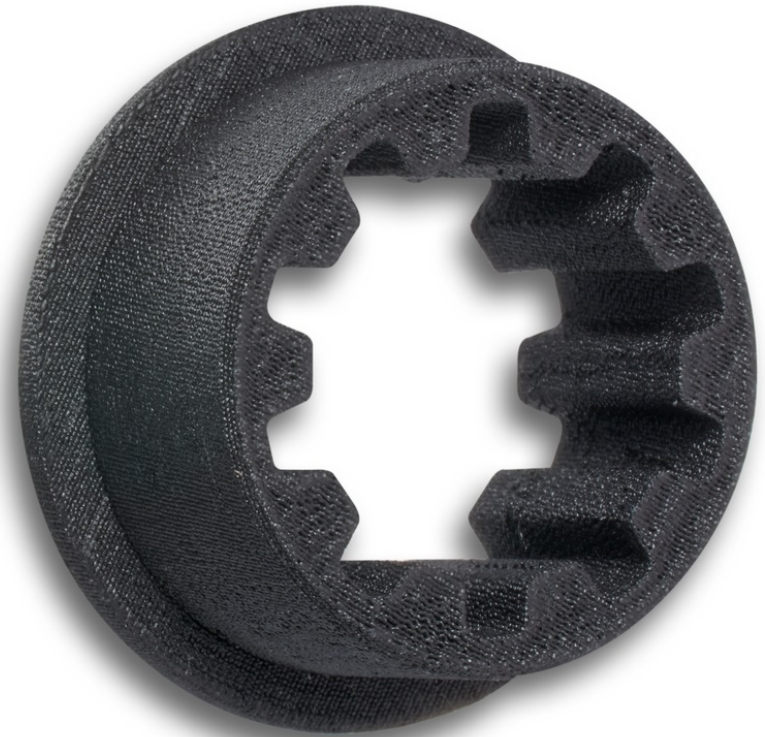


# SLIDING BEARING

Abrasion-resistant material

*Material: Iglidur (I180-BL)*

Customer-specific material compound





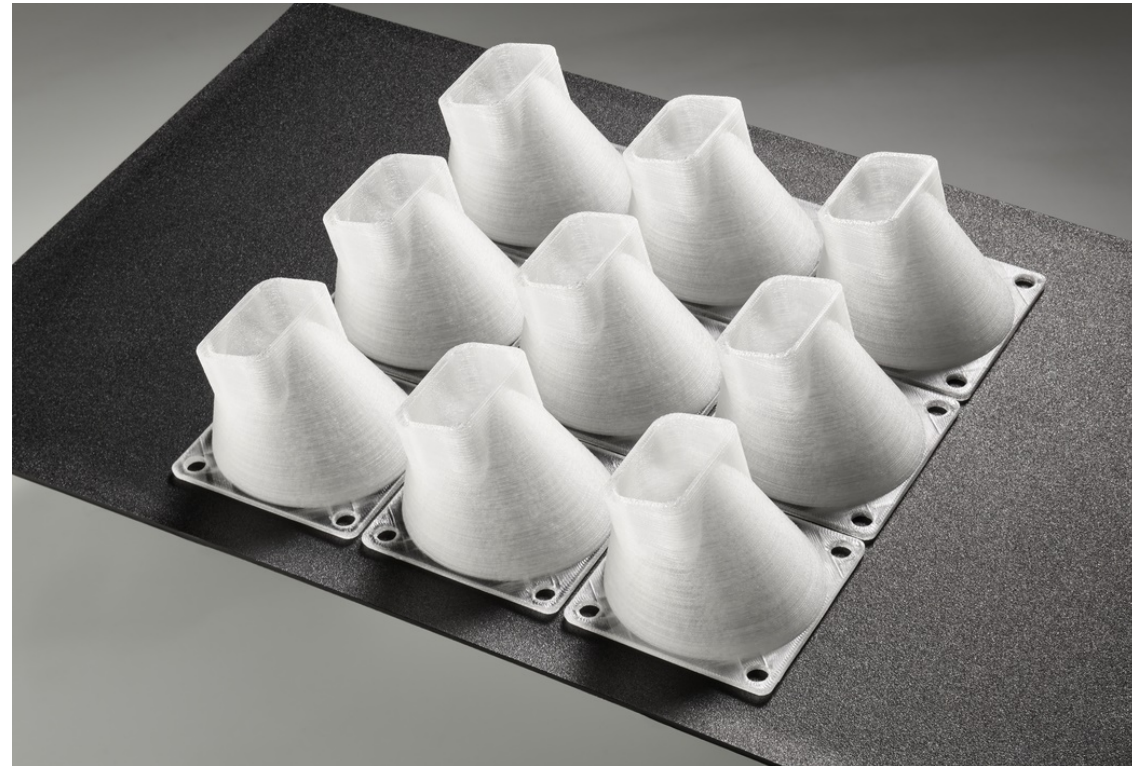
# AIR NOZZLES

PC with flame proofing

*Material:*

*PC Lexan 940*

- Flame-proof special material
- Original material certified for aerospace use
- High geometric precision



# NUTCRACKER

Robust, functional part

*Material: PA Grilamid XE 4010*

Chemically resistant plastic with  
outstanding durability

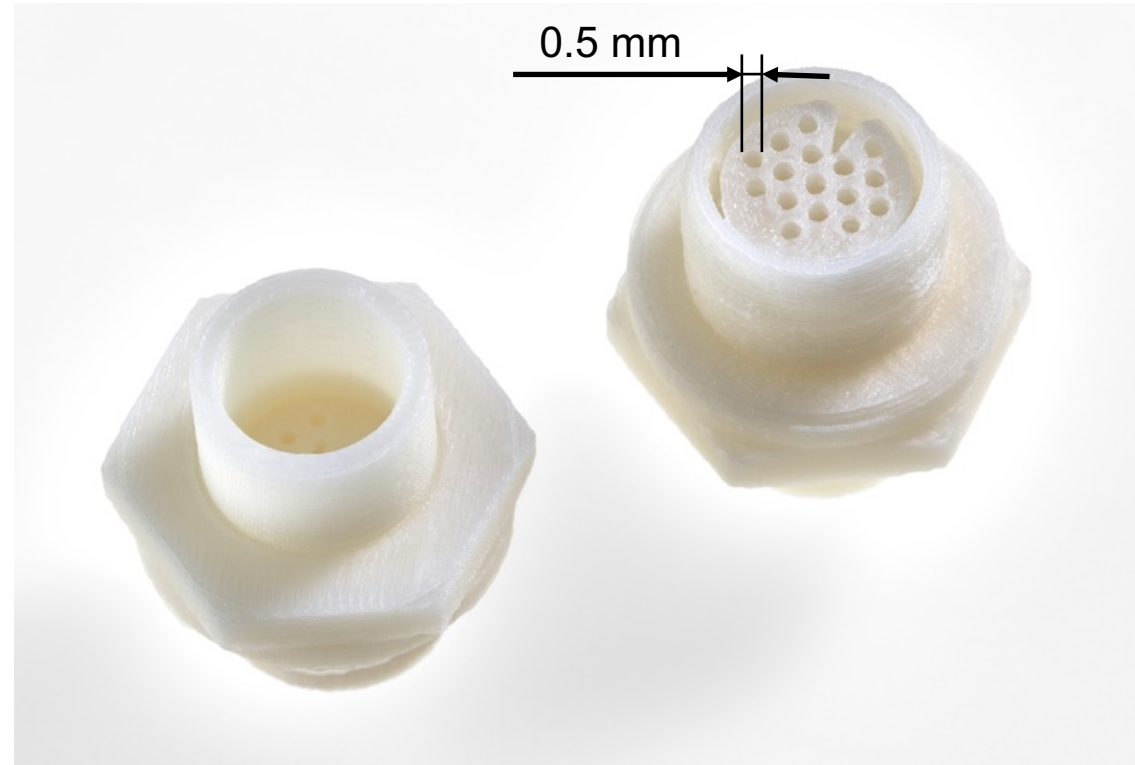


# ELECTRICAL CONNECTOR

PC/ABS blend with flame-proof properties

*Material: PC-ABS  
Bayblend T65 XF*

- Production of delicate structures
- High geometric precision
- Flame-proof special material

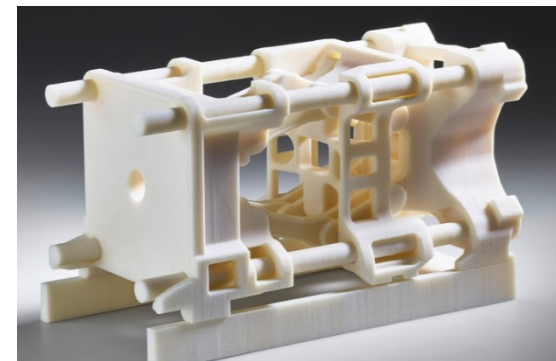
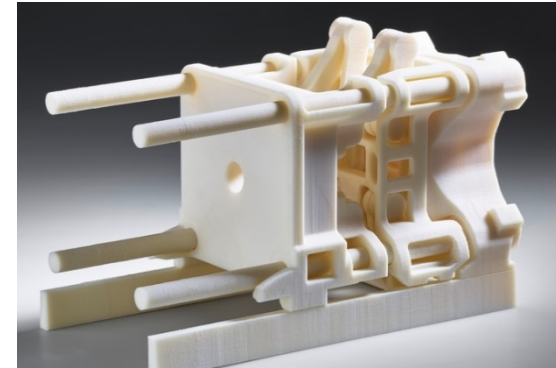


# TOGGLE MODEL (1:16)

Moving component produced without assembly

*Material: ABS  
Terluran GP35*

- Model with 30 moving joints produced in a single step
- 100 million droplets

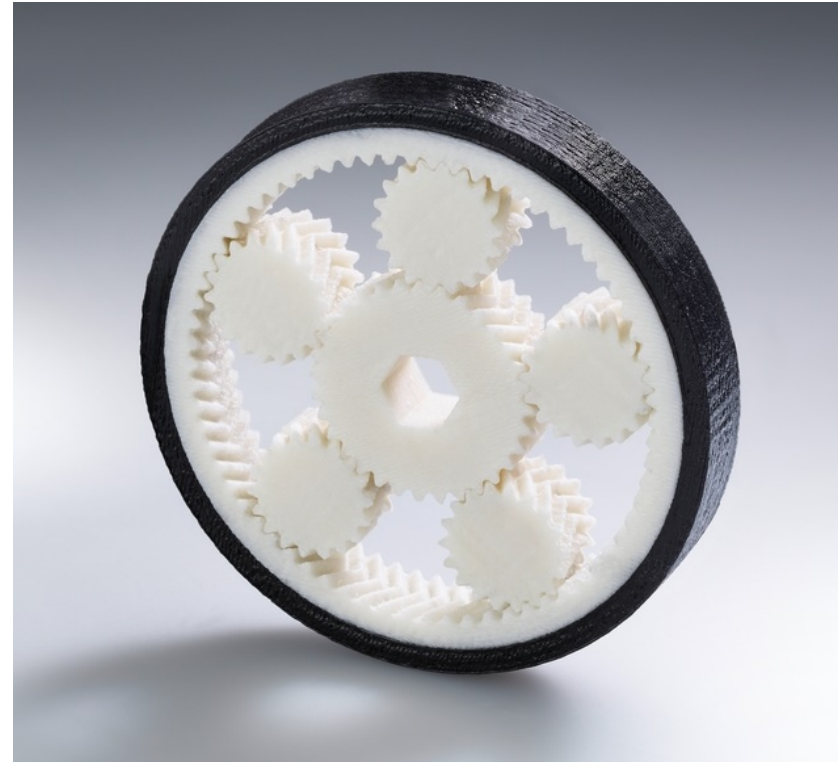


# PLANETARY GEAR

Biodegradable biopolymer\*

*Material: ARBOBLEND +  
TPU Elastollan C78A  
(80 Shore A)*

- Moving component produced without assembly in a single step
- High geometric precision
- Good clamping unit adhesion thanks to surface roughness (droplet structure approx. Rz 75)
- Force/bond adhesion similar to material compatibility during multi-component injection moulding



\* according to ISO 14850

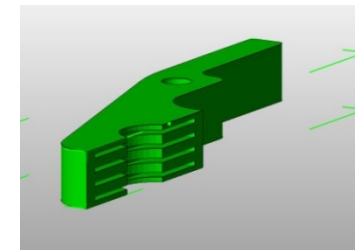
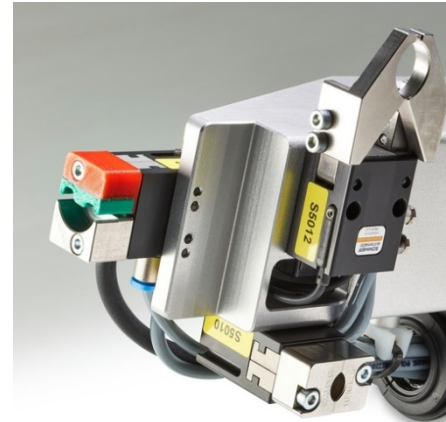


# SOFT-TOUCH GRIPPER FINGERS

Hard-soft combination

*Material: PA Grilamid XE 4010 +  
Desmoflex 9880*

- Individual design with soft-touch surface
- Good clamping unit adhesion thanks to surface roughness (droplet structure approx. Rz 75)
- Force/bond adhesion similar to material compatibility during multi-component injection moulding
- Special geometry for even better adhesion



# PERSONALISED ROCKER-TYPE LIGHT SWITCH

Injection moulding + additive manufacturing

*Material: ABS  
Terluran GP 35 +  
TPU Elastollan C78A  
(80 Shore A)*

- Injection-moulded high-volume product (PC)
- Additive enhancement with 3D symbol and lettering
- Dyeing via masterbatch

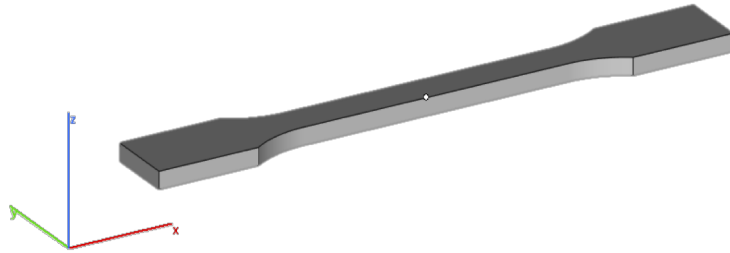


# FREEFORMER PARTS QUALITY

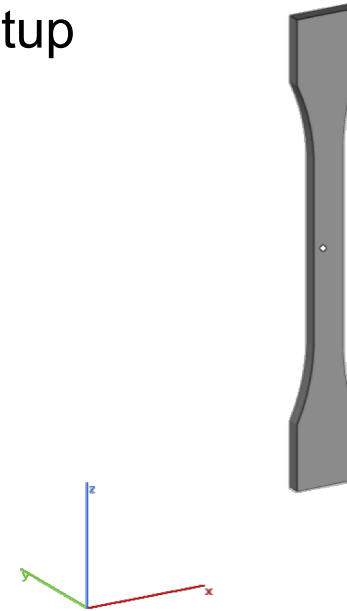
Tensile rods as a basis for analyses

Differentiation

horizontal =  
horizontal setup

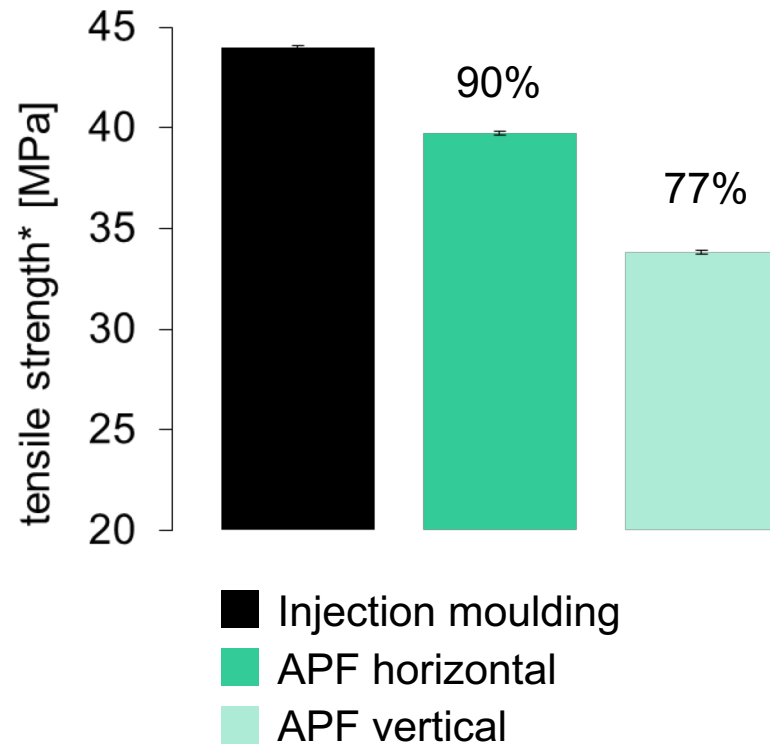


vertical =  
vertical setup



# MECHANICAL STRENGTHS

## ABS Terluran GP35

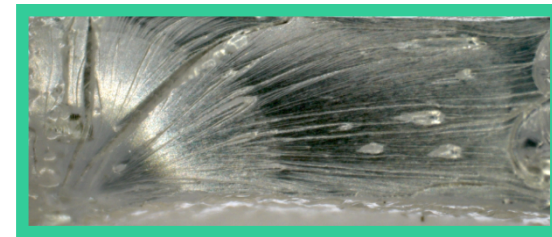
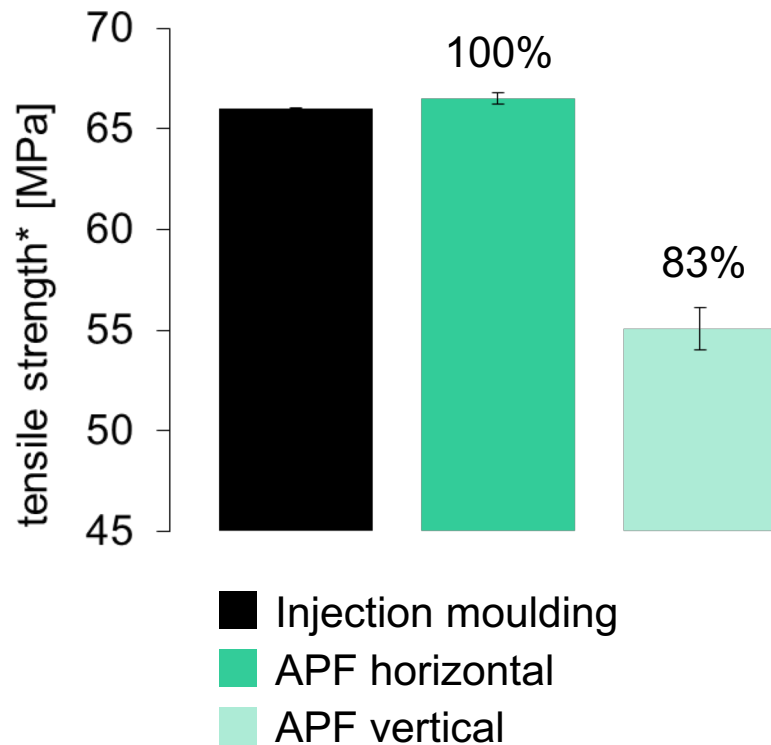


Close-up images of the fracture surface

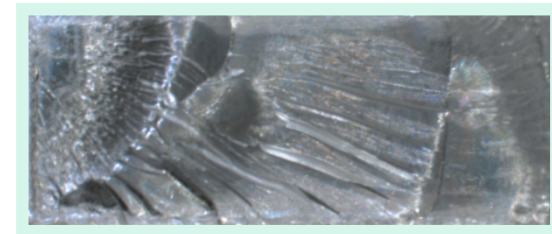


\* Tensile test according to DIN EN ISO 527-2 test piece geometry type 1B - layer thickness 0.2 mm

# MECHANICAL STRENGTHS



Close-up images of the fracture surface



\* Tensile test according to DIN EN ISO 527-2 test piece geometry type 1BA - layer thickness 0.2 mm



# DENSITY

## PMMA







QUALITÄT KNOW-HOW  
MASCHINEN TECHNOLOGIEN  
**HEIMAT DES  
SPRITZGIESSENS**  
MARKTFÜHRERSCHAFT  
LEIDENSCHAFT WEITBLICK  
INNOVATION

**WIR SIND DA.**