

Micro laser services &  
Additive Manufacturing



Manufacturing of components  
by laser technologies



Laser services

## Laser cutting

### Larger formats

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#### From prototype to serial manufacturing

Laser cutting is both suitable for making prototypes as for manufacturing larger series.

#### Cutting of troublesome and exotic materials.

Besides standard materials like steel and stainless steel, Raytech has a broad knowledge of parameters to process 'exotic' and difficult to cut material. A few examples: copper (highly reflective), platinum, silicium,...

#### Laser cutting of metal-plastic sheets and meshes.

#### Specifications:

Stainless steel: max. 12mm

Steel: max. 15mm

Aluminium: max. 6mm

Titanium: max. 5mm

Copper alloys: max. 2mm

max reach: 3000 x 1500 mm



## Micro laser cutting

### High precision & burr-free

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Laser cutting of microscopic small components.

Foil laser cutting, starting from thickness 0,01 mm

#### Specifications:

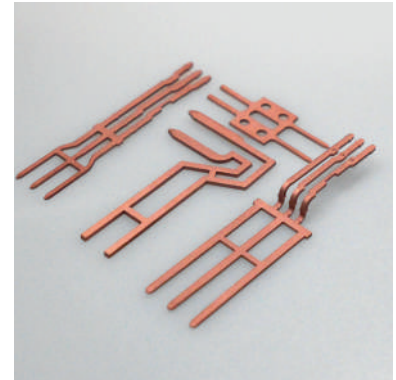
Accuracy: min. 15 $\mu$ m

Min. sheet thickness: 0,01 mm (foil)

Max. reach: 500 x 500mm

Min. hole  $\varnothing$ : 0,010mm

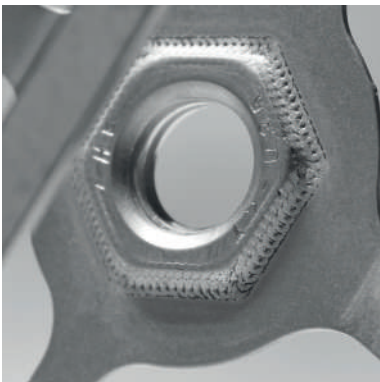
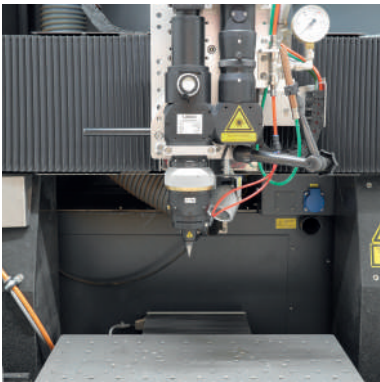
holes/sec: 3-5



## Laser welding

### Precision joining

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Laser welding is a joining technology where laser light is used to melt material together.

#### Focus on tooling & fixation.

An air-tight alignment of the components who need to be welded is crucial to make a smooth and strong welding. Therefore, precise CNC machined tooling & fixation is required.

### Advantages

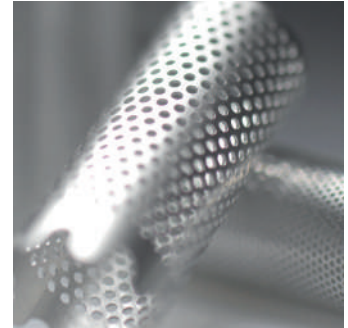
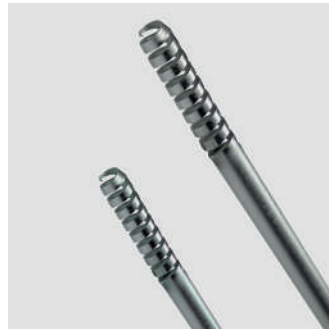
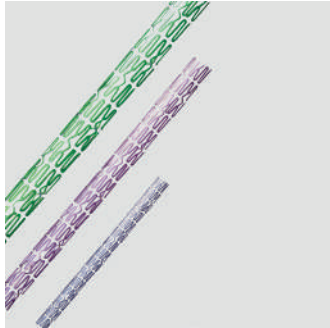
- No additional welding material
- Welding of microscopic small components
- Fine welding seams, high precision welding
- Small heat affected zone, minimal deformation
- Connecting thin sheet materials
- High production speeds
- Deep & long welding seams possible
- Connection can withstand heavy load
- Possible in sheet & tube



## Tube laser cutting

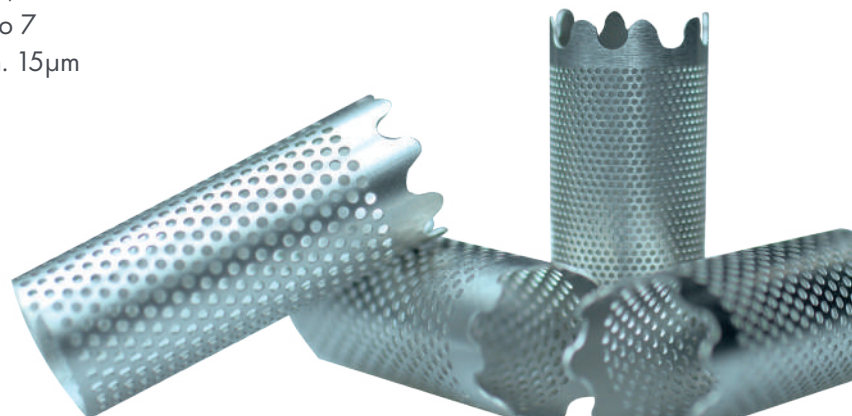
### Manufacturing of tubular components

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**Production of tube components on in-house developed laser machines.**  
These custom tube lasers allow to economically produce large series of tubular components. High cutting speed without any loss of accuracy.

**Specifications:**  
Min. tube  $\varnothing$  : 0,8mm  
Max. tube  $\varnothing$ : 250mm  
Min. hole  $\varnothing$ : 0,010mm  
holes/sec: 3 to 7  
Accuracy: min. 15 $\mu$ m



## Laser drilling

Up to 1500 holes / second

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### Micro laser perforations

By single pulsation cutting, it's possible to drill up to 1500 holes per second. A single laser beam produces in-shots which create minuscule holes, one by one, at a tremendous speed. This means holes can be made without cutting a circle contour.

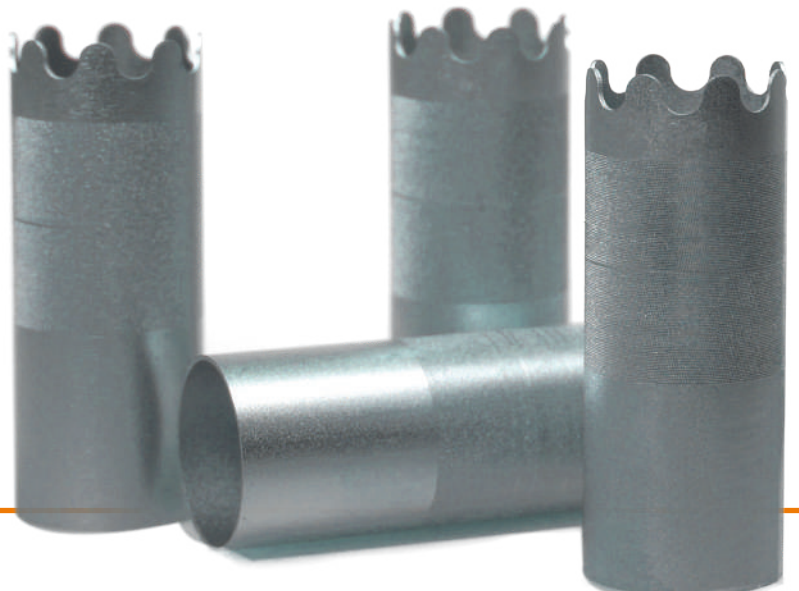
### Specifications

Min hole  $\varnothing$ : 0,05mm

holes/sec: from +/- 400 to 1500

Possible in both sheet & tube material

The technique of laser drilling is especially used for applications containing a large amount of holes. Eg. filtration components



## Laser hardening

Treat only the surfaces you want

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### Principle

- Possible with curable materials (min. 0,2% C)
- Heating material locally
- Avoid melting, solidified material is particularly rough and brings extra tension into the component
- By rapid cooling (shock), material structure transforms
- From austenitic to martensitic.

### Advantages

- Local hardening
- Possible at difficult to reach surfaces
- Increase wear resistance (Vickers)
- Reduce friction coefficient



## Laser engraving

### Customization

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Laser engraving is a reliable method to quickly identify or personalize components.

- Traceability of mass productions
- Texts, pictures, QR-codes, serial numbers,....
- Permanent engraving, resistant to acids or cleaning agents
- Bitmap engraving
- Large variety of materials possible

# Development & engineering

## From seven components to one.

Initially, this gripper consisted of seven parts which were made using multiple production processes. Raytech reduced these **seven components** to one, with a single cutting process.

- CNC milling
- CNC turning
- Wire EDM
- Laser welding
- Assembly
  - Riveting
  - Spring elements



Original proces

After redesign

Laser cutting



# Additive manufacturing

THINK  
DIFFERENT

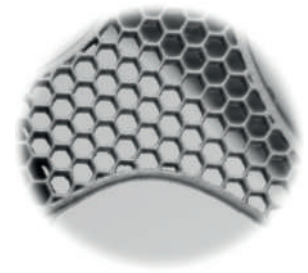
## 3d metal printing

### New possibilities

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#### Reasons to start 3D printing:

- 1 Make it light, elegant and more functional**  
Several functionalities of multiple components can be combined in just a single 3D printed part. So, 3D designers go ahead!
- 2 Material efficiency compared to subtractive techniques**  
No unnecessary material waste by building layer-by-layer.
- 3 Rethink your components**  
3D printing offers a new way of construction components. For example, internal cavities or unique shapes can be produced that are almost impossible to produce with conventional techniques. Take the lead by reinventing your current products.
- 4 Personalization**  
As no tooling is required, each parametric designed components can quickly be manufactured.




**Additive Manufacturing (AM)** provides new insights and fresh opportunities in the manufacturing industry. Existing projects can be optimized and new designs can be made with new possibilities in terms of design and personalization.

#### Subtractive vs. additive produced gearwheel

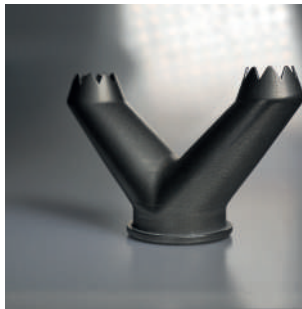
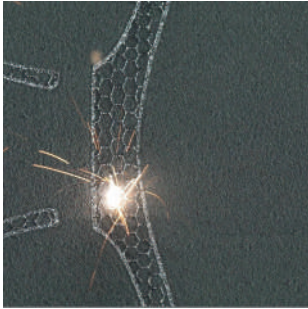
- Light weight gearwheel
- Material efficient
- Advantage gearwheel: higher accelerations (belt drive) possible





“The major  
obstacle  
of Additive  
Manufacturing  
is your own  
imagination.”

## Additive Manufacturing



### Titanium

Components printed in titanium alloy Ti64 are both strong and extremely light. The material is also corrosion resistant which makes titanium a suitable material for critical components.

### Aluminium

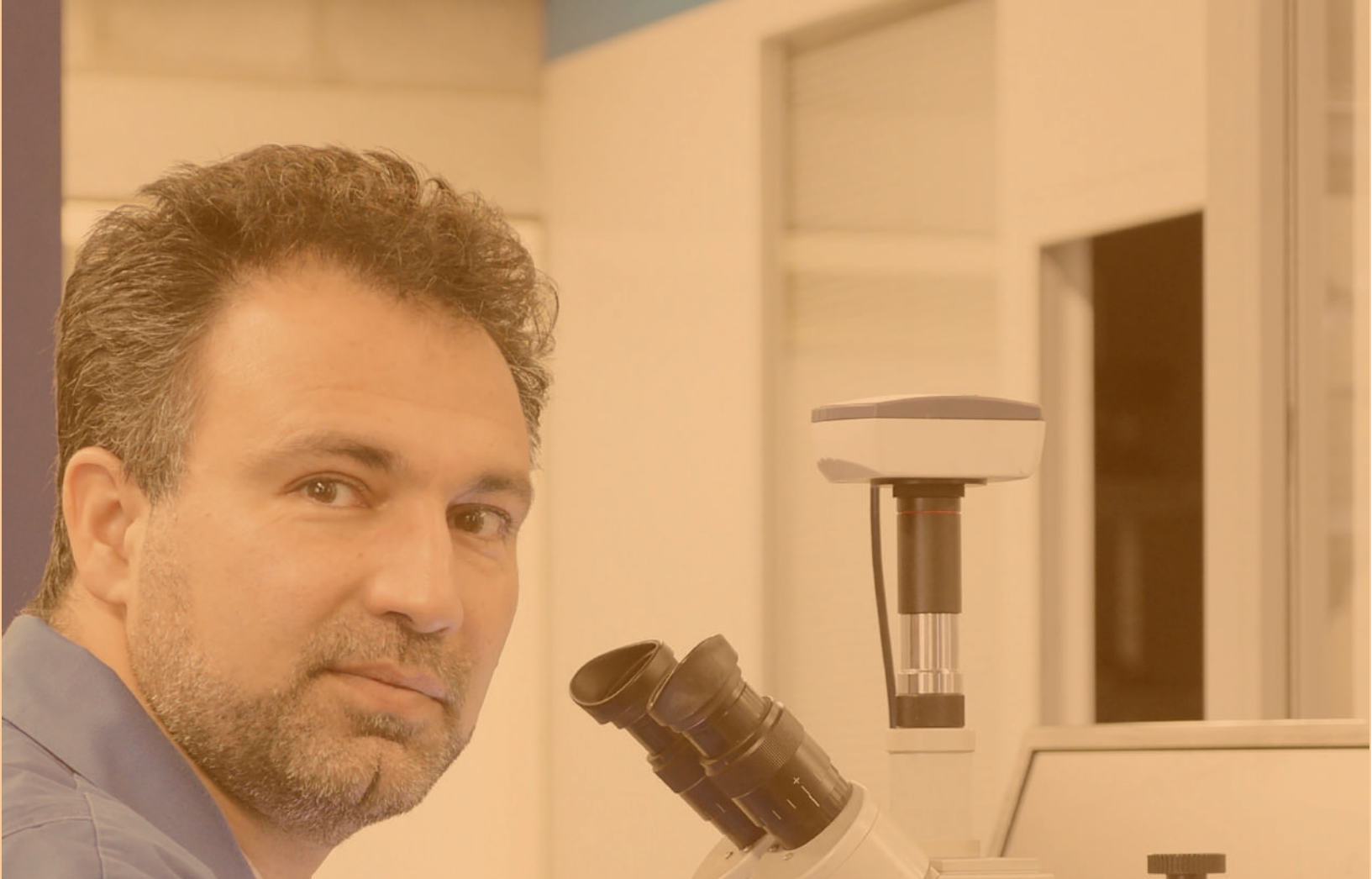
Printing AlSi10Mg alloy is suitable for applications where a good combination between thermal characteristics and lightweight is required.

### General specifications

SLM powder bed technology

Building table: 250 x 250 x 300 mm

	Ti64	AlSi10Mg
Accuracy (before finishing)	0,2mm	0,2mm
Min. wall thickness	0,3mm	0,4mm
Powder layer	0,02 – 0,06mm	0,02 – 0,1mm



## Measuring and quality control



## Quality assurance

### Follow-up of productions

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#### Critical components

For components with strict quality requirements, production can take place in dust-free and air-conditioned rooms.

#### Mass production

For certain applications, a standard laser machine available at the market won't do the job. For such cases, Raytech has the possibility to develop a custom made machine. The combination of a tailor-made laser machine and further automation enables to economically manufacture large series. For example, automatic measuring & cleaning.

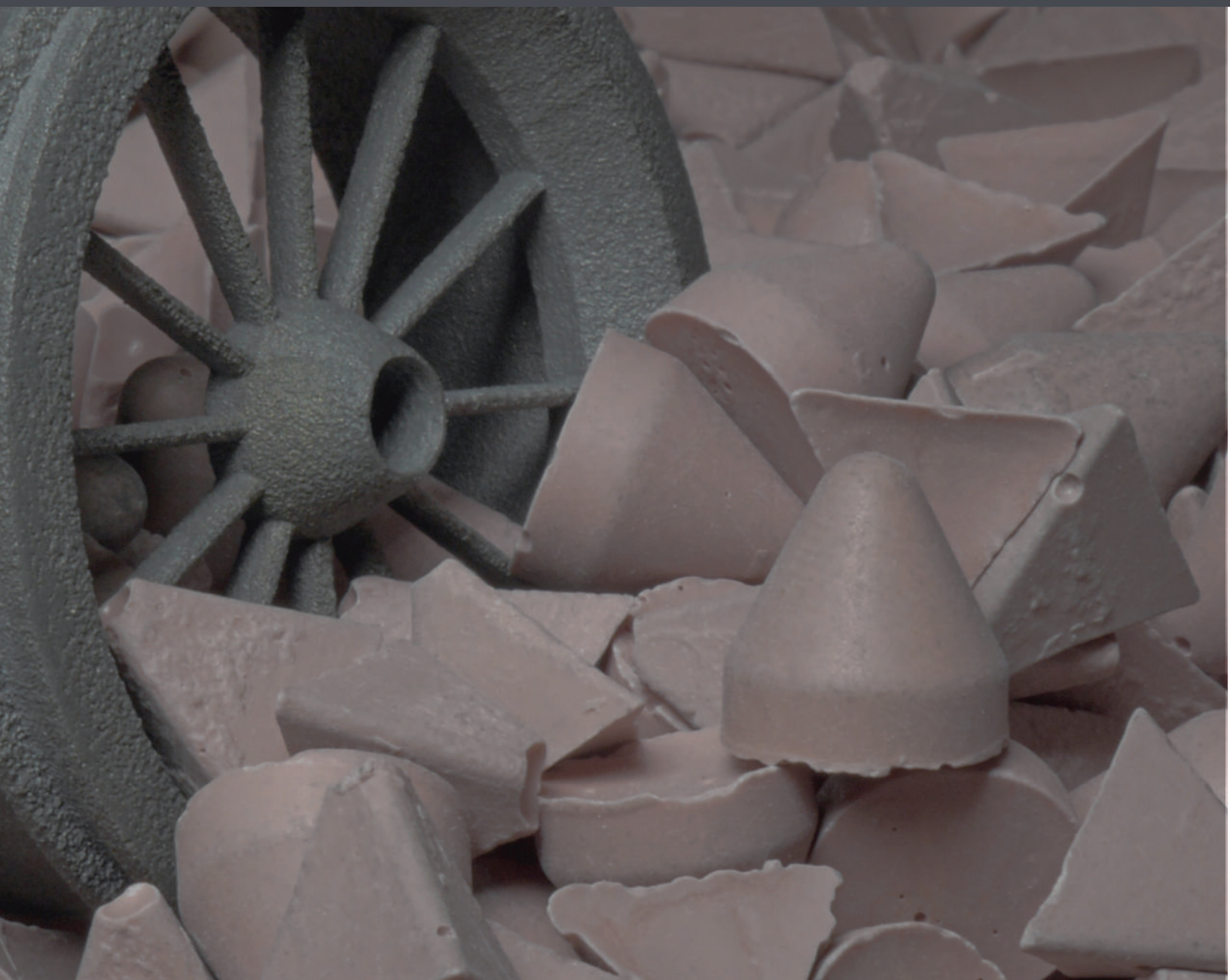
#### In-line camera inspection

To guarantee the correctness of mass produced components. Live control of measurements and part deformation.

Measuring is knowing. Guessing is missing.



# Additional services





Before



After finishing & sandblasting



Raytech has a finishing area where components can be finished and cleaned before shipping. Several **finishing techniques** can be applied to achieve the desired look and surface roughness.

- Ultrasonic cleaning
- Dry –and wet sandblasting
- Chemical etching
- CNC turning - milling
- CNC Bending
- Vibratory finishing

## Contact



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