EPIC Online Technology Meeting on Impact of Photonics on Sustainable Textiles, Wearables, Fashion and Design - 24 march 2021

# Metal Additive Manufacturing for the fashion and jewellery industry.

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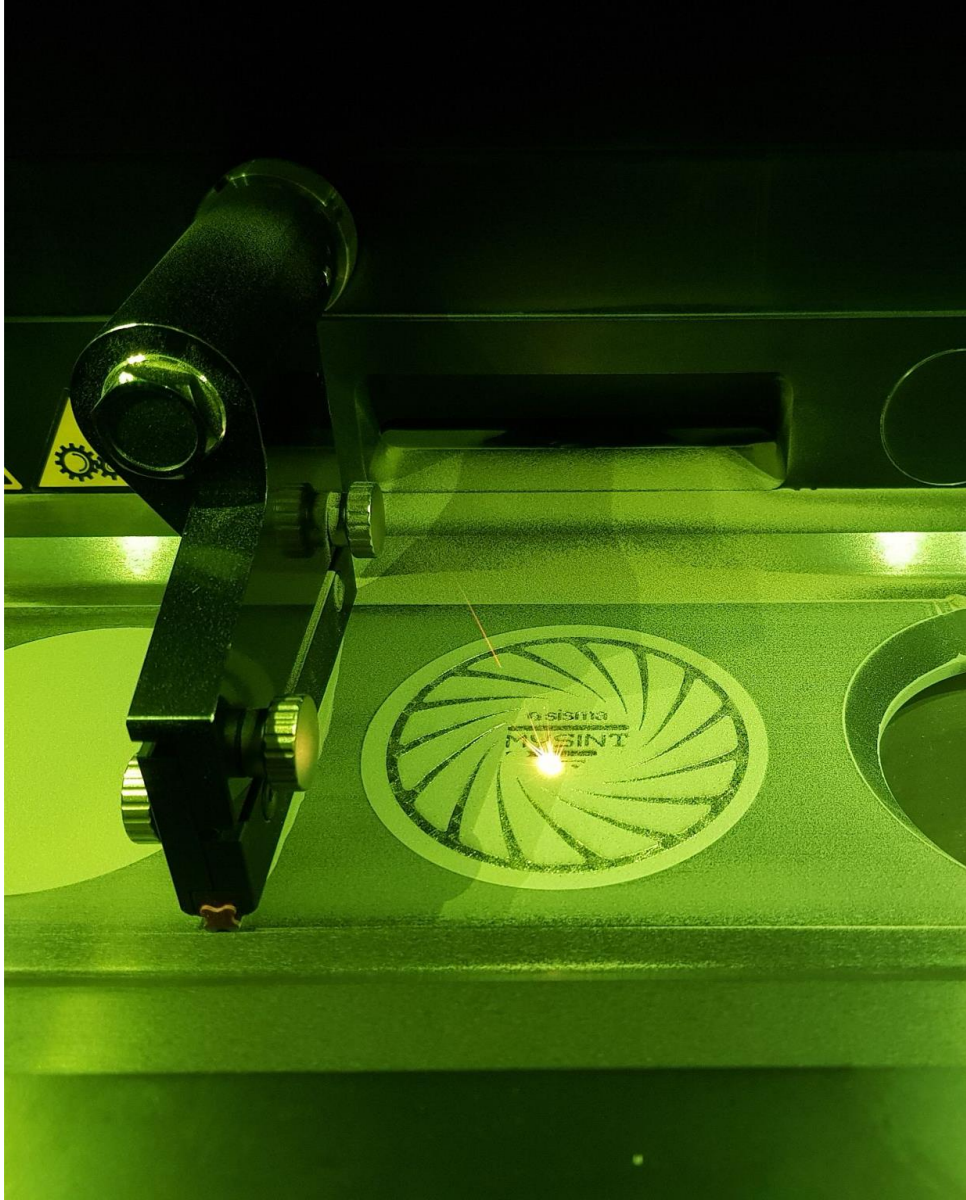


**1961**
SISMA foundation

**1967**
First production plant
in via Piemonte, Schio

**1976**
Beginning of
jewelry machines
production

**1978**
Production plant
in via Lombardia, Schio

**2001**
Beginning of
laser production

**2012**
SISMA HQs in Piovene Rocchette

**2014**
Joint venture with
Trumpf for Laser
Metal Fusion

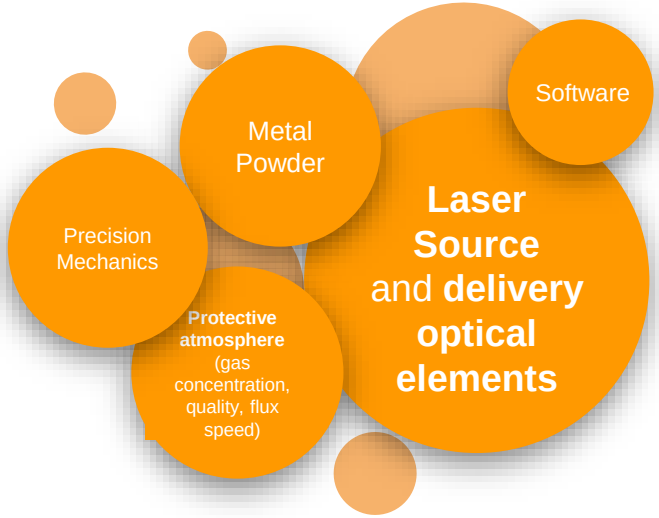
**2016**
New production plant
in via Piemonte, Schio

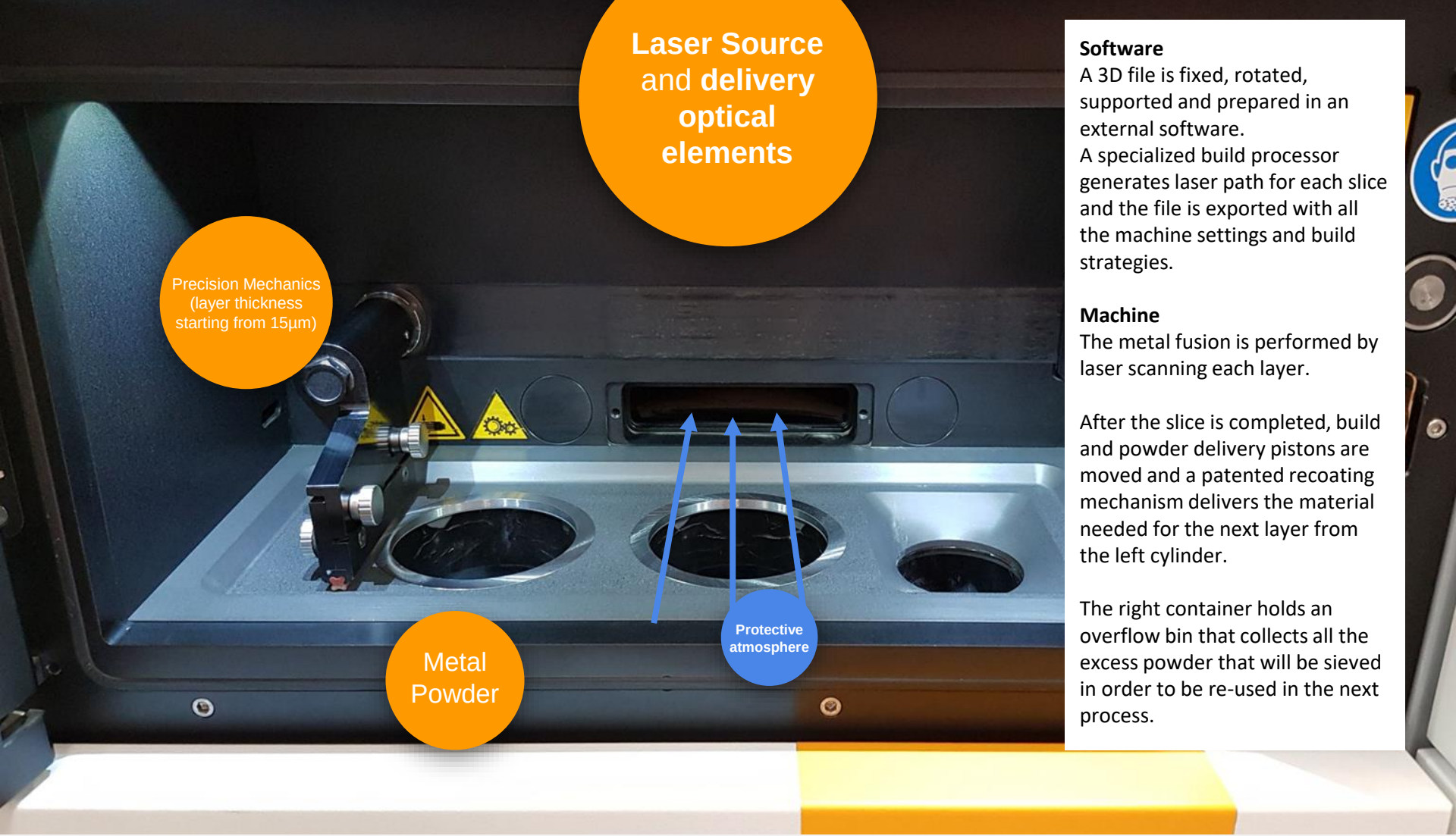
**2021**
New industrial plant
in Piovene Rocchette

**2021**

# **MYSINT100**
# **and LMF** (Laser Metal Fusion) **technology.**

A Laser Powder Bed Fusion machine developed to fulfill jewellery and fashion needs.
Building envelope up to Ø100mm and 200W laser power.




**Software**
A 3D file is fixed, rotated, supported and prepared in an external software.
A specialized build processor generates laser path for each slice and the file is exported with all the machine settings and build strategies.

**Machine**
The metal fusion is performed by laser scanning each layer.

After the slice is completed, build and powder delivery pistons are moved and a patented recoating mechanism delivers the material needed for the next layer from the left cylinder.

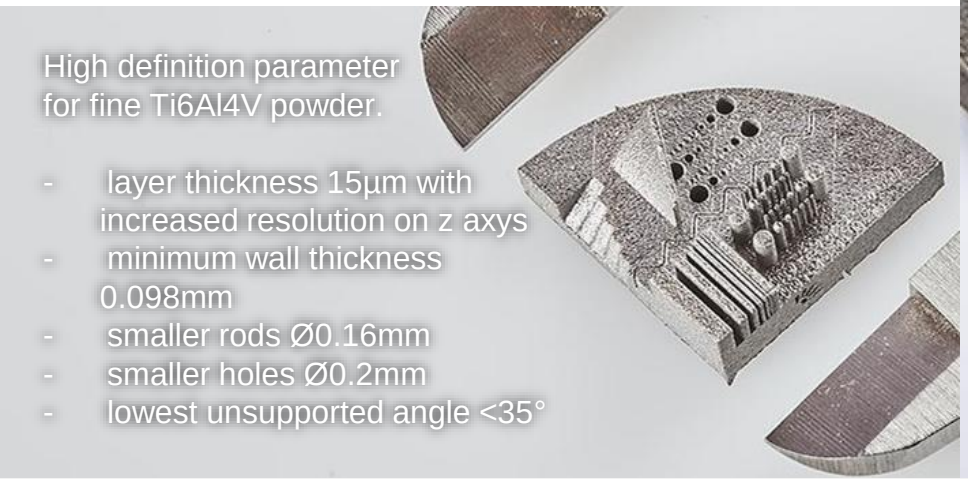
The right container holds an overflow bin that collects all the excess powder that will be sieved in order to be re-used in the next process.

## LASER

200W Fiber laser source at 1070nm

## BEAM SPOT DIAMETER

The laser is focused through a Quartz F-Theta lens.
Two beam spot sizes are available.
General purpose/High productivity: 55µm
**High precision/Energy density: 30µm**



High definition parameter for fine Ti6Al4V powder.

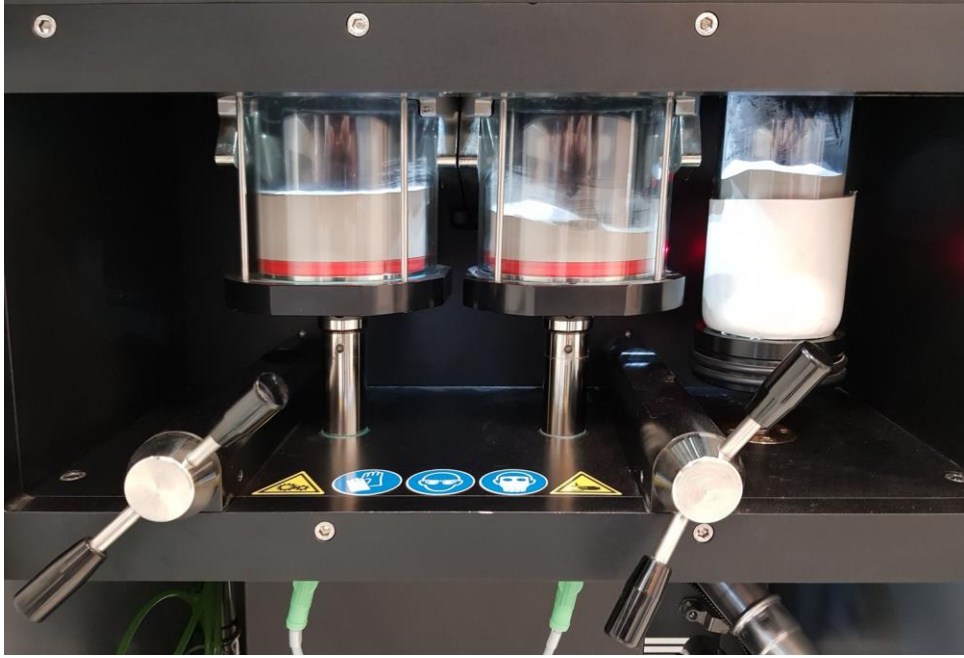
- layer thickness 15µm with increased resolution on z axys
- minimum wall thickness 0.098mm
- smaller rods Ø0.16mm
- smaller holes Ø0.2mm
- lowest unsupported angle <35°

## WORKING WITH FINE POWDERS

Sisma chose to develop a machine:

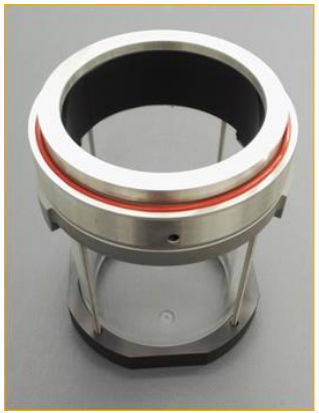
- **circular build envelope**
- **tempered glass cylinders**

The resulting system is easy to service, powder and gas tight and robust.



## PRECIOUS AND HARD TO FIND METALS

Machines developed for Jewellery and R&D purpose are equipped with removable cylinders.
The building platform could be reduced to **Ø63.5mm** and **Ø34.5mm**



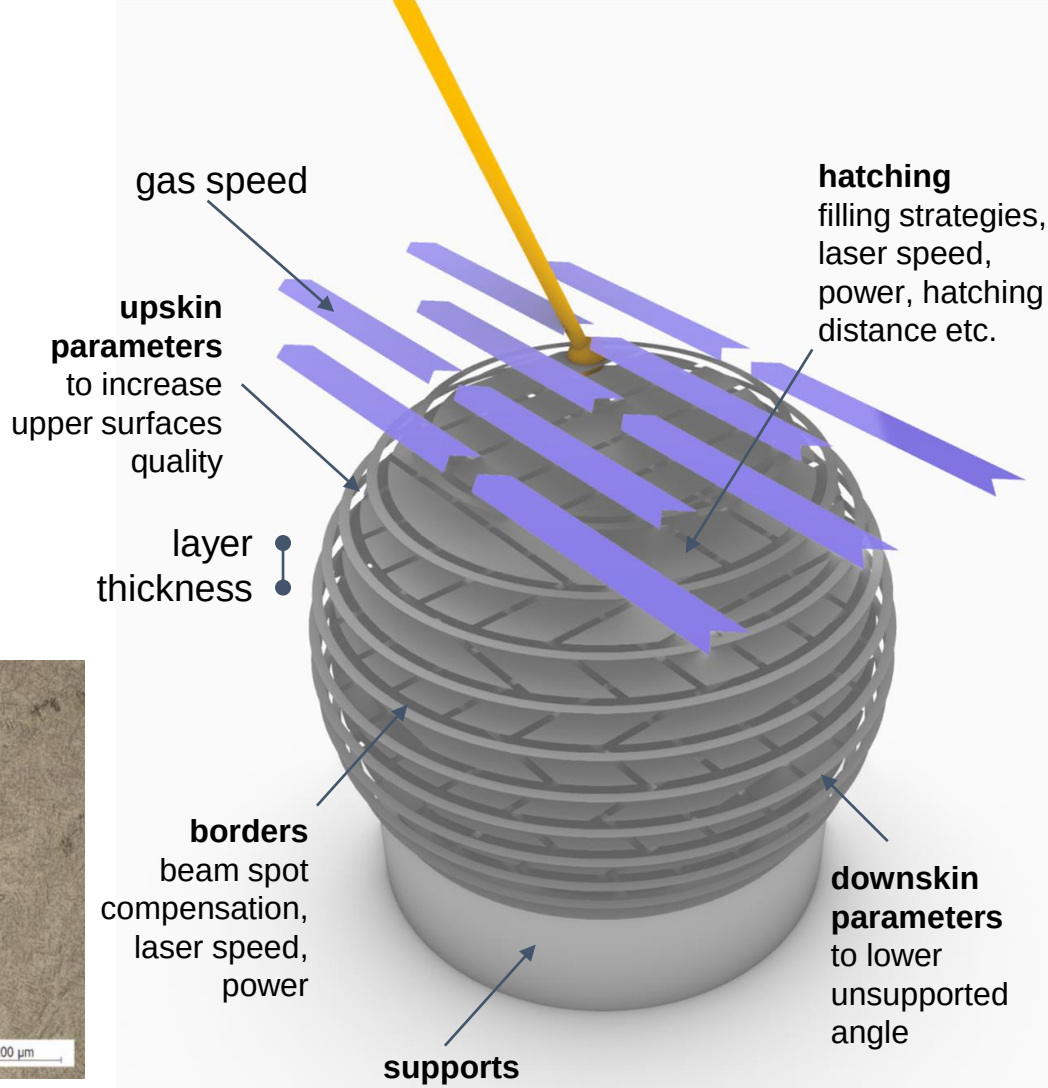
## PRECIOUS METAL RECOVERY

**A burnable paper filter can be installed in the gas outlet of the build platform.**

Some powder might be sucked by the gas recirculation flux. This prefilter can catch all the flying particles and can be burned in order to recover all the precious metal that might get lost.

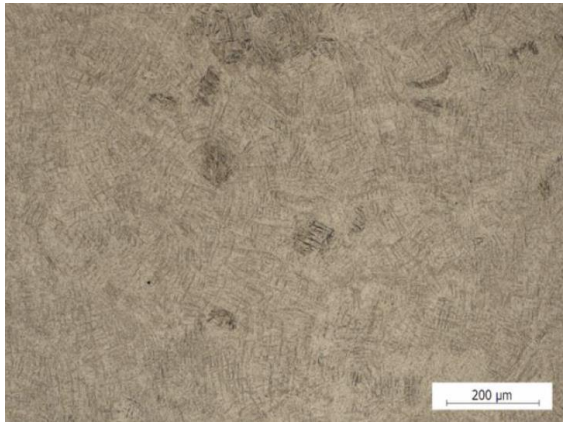
## OPEN PARAMETERS

Full customization of building parameters and possibility of custom material development.




**Microstructure of Ti6Al4V gr.23.**

If as built Ra is roughly 10µm, the density of parts built with official parameters is over 99.8%.



# DRIVERS FOR DIRECT METAL 3D PRINTING IN THE FASHION INDUSTRY

- prototype in final material
- mass customization
- capsule collections
- freedom of geometry

# Thanks for listening!

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high precision manufacturing solutions
**machinery & laser systems**

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