

spengler

Consulting and Engineering for Additive Manufacturing

What do

In brief

Spengler delivers to its customers **high-quality Additive Manufacturing consultancy**, custom hardware and software development services, advanced **post process** solutions

We do

IntegrAM post process solutions



Custom 3D printing systems design



Advanced training



Consulting



The Spengler expertise

We collaborate with research centers and machine producers, to develop, test and validate our metal and plastic finishing solutions, because **innovation** is in our DNA

■ Post processing and finishing equipment

We offer you a **tailor made solution** to address your post processing and finishing needs.

Spengler is member of the **IntegrAM** R&D team, and distributor of the **IntegrAM** equipment.

■ Custom 3D printing systems design

We are ready to the develop your next, custom Additive Manufacturing system, putting our industrial 3D printer design **expertise**, along with our **hardware** and **software engineering know-how** at your service.

 **FRANCE
ADDITIVE**
FILIERE IMPRESSION 3D


spengler


ÉCOLE
NATIONALE
INGÉNIEURS
TARBES

 **cetim**


Desktop Metal™






I
P
C
NNOVATION
PLASTURGIE
COMPOSITES


PLATINUM 3D
FABRICATION ADDITIVE

Some of the companies we worked with

The Spengler expertise

With a deep knowledge of all the main industrial SLS systems and materials, we can work with your team on all the main subjects related to your additive manufacturing production

■ Additive Manufacturing Consulting

We help you understand how your **business** can **benefit from 3D printing**, guiding you through a path that spans over different technologies and different materials.

To find a **solution** that truly fits your manufacturing needs.

■ Training and Application engineering

We help you gaining **competitive advantage**, by making the most of your Additive Manufacturing systems, collaborating with your R&D team and supporting you through the phases of product creation, from the concept to the finished part.

■ Process development

We define the working parameters for your next laser sintering polymer, to make you and your customers immediately productive with the new material.

PRODWAYS
GROUP

FARSOON
TECHNOLOGIES

3D SYSTEMS

EOS

ARKEMA

BASF
We create chemistry

FABULOUS
INNOVATIVE MATERIALS + 3D APPLICATIONS

AM Polymers

Some of the companies we worked with

spengler

AUTOMATION FOR



Productivity



Consistency



Costs reduction

The IntegrAM Group

Post-processing and finishing equipment

IntegrAM is a network of companies created with the aim to bring **automation** to the additive manufacturing post processing workflow.



The **IntegrAM** founding partners are:

- **SPENGLER (FRANCE)**
- **ROLLWASCH (ITALY)**
- **TECHNOSURFACE (ITALY)**

IntegrAM hardware solutions for...

- Automatic de-caking, cleaning, sieving and finishing
- Automatic depowdering
- Automatic MicroFluid mass finishing
- Ultrasonic cleaning
- Surface Compressive Residual Stress improvement

IntegrAM services

- Small batches benchmarking
- R&D Projects with partners

Post processing **systems**

SMR Standard tribofinishing



Classic **tribofinishing** systems for **plastic** and **metal**, dry or wet processes possible.

SurfPro MF surface finishing



Microfluid patented surface finishing technology. Fully automatic evolution of the tribofinishing process, that make use of **abrasive gels**. For **plastic** and **metal**.

Vibroblast Air powder removal & blasting



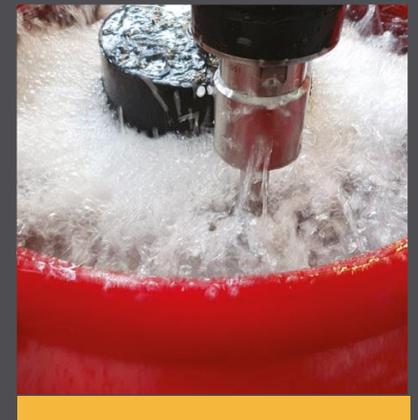
Patented tumble and blast process. An alternative to rotational sandblaster, that also pre-finishes the surface. For **SLS** and **MJF**, can be used to blast **metal parts** as well.

DCK Series decaking tools



Unique SLS/MJF decaking systems. The **DCK 01** is a «all in one» system for decaking, parts cleaning and powder recovering. The **DCK 350** is for heavy load applications.

Ecosonic ultrasonic cleaner



Automatic ultrasonic washing system for medical and food applications.

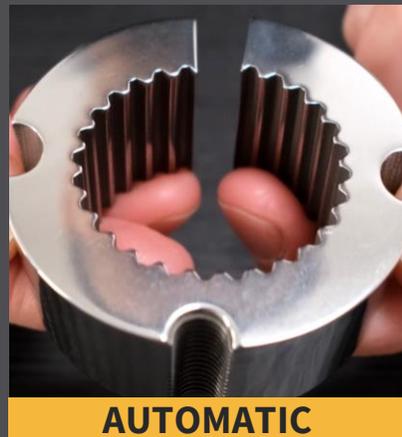
Post processing **systems**

SMR Standard
tribofinishing



MANUAL
Plastic & Metal

SurfPro MF
surface finishing



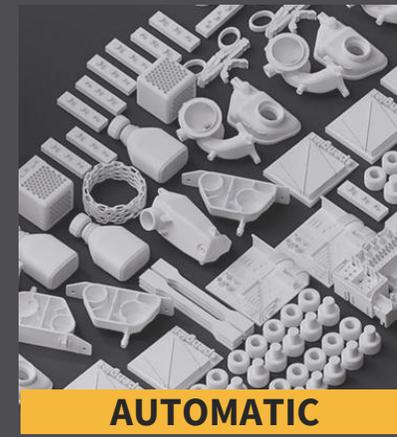
AUTOMATIC
Plastic & Metal

Vibroblast Air
powder removal
& blasting



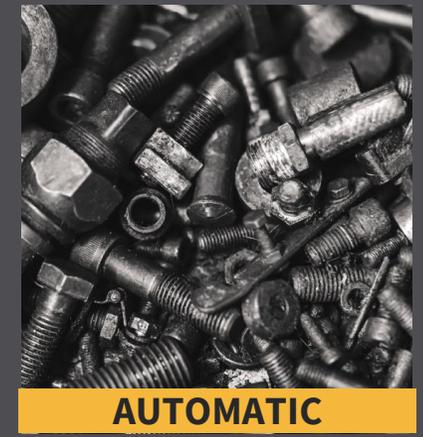
AUTOMATIC
SLS/MJF & Metal

DCK Series
decacking tools



AUTOMATIC
SLS/MJF

Ecosonic
ultrasonic cleaner



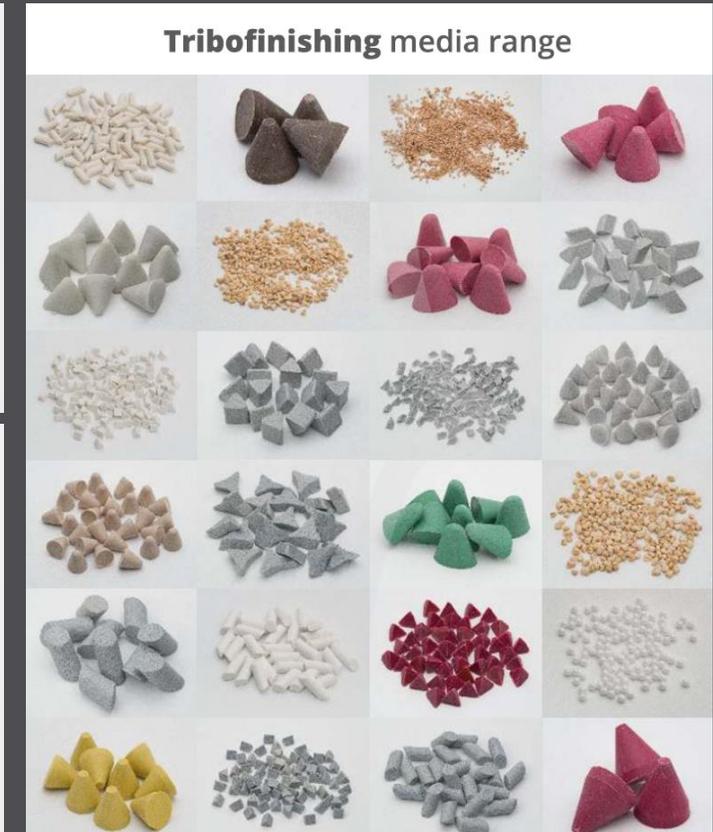
AUTOMATIC
Plastic & Metal



Technology deep dive

SMR Systems

Standard tribofinishing tools for **metal** and **plastic**



Capable of dry and wet process, **The SMR50** features **30% more volume** and **60% lower price point** than other tribofinishing solutions for additive manufacturing.

SurfPRO systems

Surface finishing systems for **metal** and **plastic**

The **SurfPRO MF** allows operating **microfluid** (patent pending) multi-task processes.

Thanks to an automatic abrasive gel-dosing system, **SurfPRO** seamlessly pass through three different surface finishing stages: from tough to medium abrasion to mirror polishing.

Fully **automated**, **cost efficient**, perfect for parts with **small/delicate features** as well as **massive geometries**

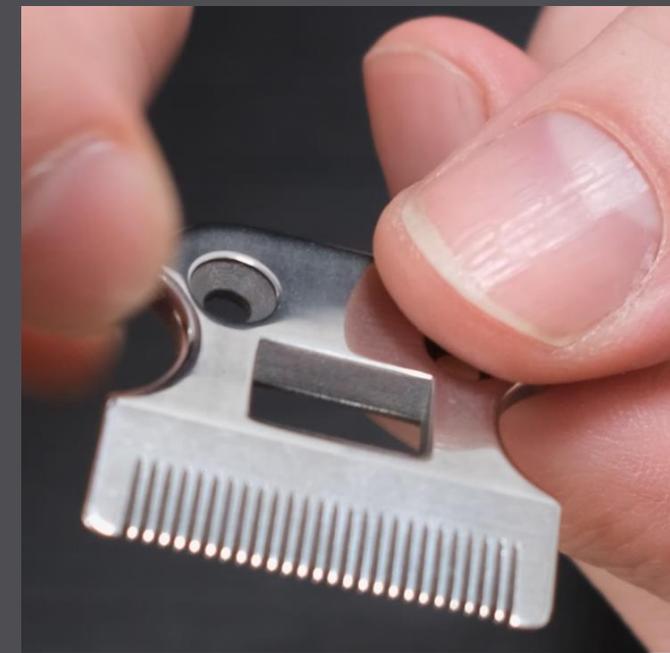
Suitable for metal **SLM**, **DMLS**, **Binder Jetting** technologies, as well as plastic **SLS** and **FDM** technologies



Surface Finishing + polishing



Part Sanitization cycles



SurfPRO systems

Surface finishing systems for **metal** and **plastic**



Microfluid technology, the main **advantages**

Automatic – SurfPRO brings a **new level of automation** to the **surface finishing** world.

Once started, the machine will **dose automatically the different gels**, and perform **automatic cleaning** after each cycle. The operator only needs to load the parts and unload them at the end of the process.

Affordable - With **just one machine** you can perform all the steps aforementioned, without the need for human intervention: just put your parts in the machine, load your recipe, and **press play**. **Less hardware** in your factory, **less labor**, and a **low TCO** (total cost of ownership) granted by low-cost consumables and extremely low maintenance needs.

Gentle with small features - Compared to other mechanical finishing technologies, the patented SurfPRO process is much more **gentle**, allowing to reach **extremely low Ras** without **destroying thin details** and **preserving sharp corners**.

Flexible -The SurfPros are **fully programmable** by the user: time per each cycle, the quantity of gel to be used, duration of the wash cycle, etc. If needed, you could even convert it into a traditional tumbling machine!

SurfPRO Microfluid systems

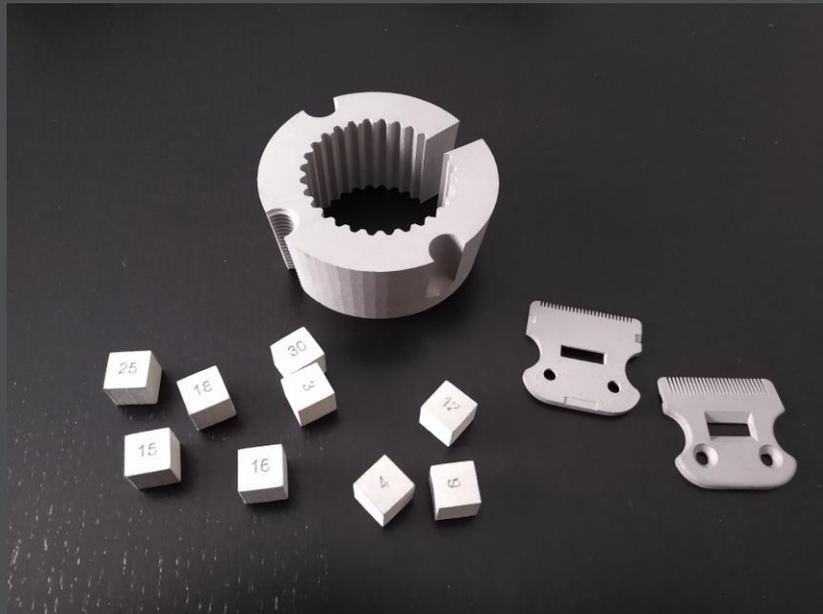
Surface finishing systems for **metal** and **plastic**

Example 01: Desktop Metal MBJ parts

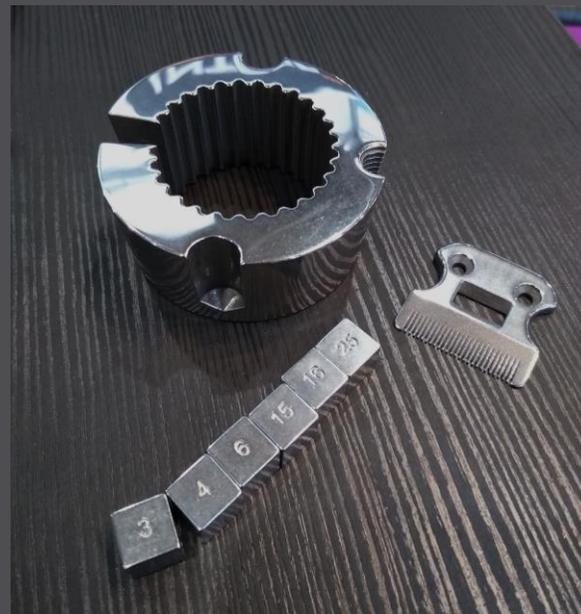
Material: stainless steel 17-4ph

Machine used: SurfPro MF 50 liters

Number of parts per cycle: 120 – 150



Ra Raw parts: **25 µm**



Ra Post-processed parts down to: **0,35 µm**



Surface Finishing +
polishing

SurfPRO Microfluid systems

Surface finishing systems for **metal** and **plastic**

Example 02: SLM part printed on Renishaw Systems

Material: stainless steel 316 ph

Machines used: Vibroblast 50 liters + SurfPro MF 50 liters

Number of parts per cycle: 60 – 80



Ra Raw parts: **35 µm**



Ra Post-processed parts: **0,47 µm**



Surface Finishing +
polishing



| MASSIVE PARTS |

7-4 PH STAINLESS STEEL - MIRROR FINISH - SURFPRO MICROFLUID

 WATCH NOW



& **INTEGR^{AM}**

for



 WATCH NOW



MICROFLUID TECHNOLOGY



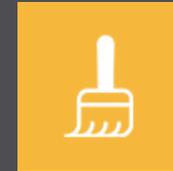
INTEGR^{AM}

VibroBLAST Air systems

Automatic powder removal for **plastic** and **metal**

The perfect 2-in-1 **automatic depowdering** and **pre-finish tool** for powder-bed additive manufacturing systems.

- **More gentle** than a rotational sandblaster for **SLS** printed parts
- **Ideal surface preparation tool** for the SurfPro (it can speed up metal surface finishing up to 30%)



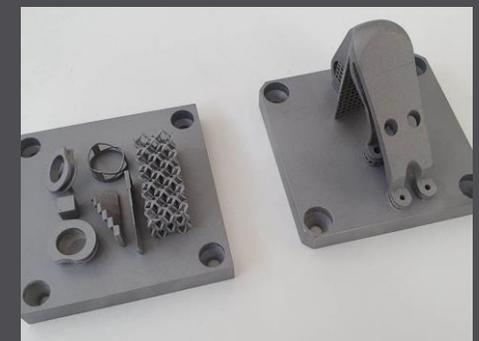
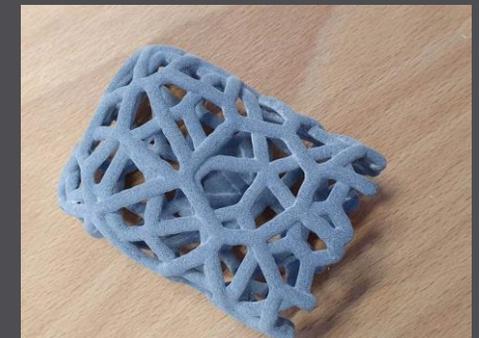
1: Cleaning

AUTOMATED DEPOWDERING
PROCESS (PATENTED)



2: Finishing

SURFACE SMOOTHING
CYCLES



IntegrAM VibroBlast machines are already successfully installed at the **CETIM** in Saint-Étienne and **HALL32** in Clermont-Ferrand

VibroBLAST Air systems

For SLS and MJF **plastic parts**

- VibroBLAST Air uses “**elastic**” **vibratory finishing media** both as **shock-absorber** and as a **three-dimensional movement vector** for the 3d printed parts, exposing them to the blasting nozzles multiple times with always different angles.
- Compared to rotational blasters, the VibroBLAST Air is by its own nature **much more delicate** in the way it handles the 3D printed parts.
- The elastic media perform a **soft abrasion** action on the parts, simulating the “brush action” and helping the powder removal
- The **PCCP versions** of the system (**Contamination Prevention, patent-pending**) allow the cleaning of the parts by using the very same material of the printed objects (e.g. PEEK) as blasting media, so as to avoid even the minimal risk to “pollute” the parts.



1: Cleaning

AUTOMATED DEPOWDERING
PROCESS (PATENTED)



2: Finishing

SURFACE SMOOTHING
CYCLES



VibroBLAST Air systems

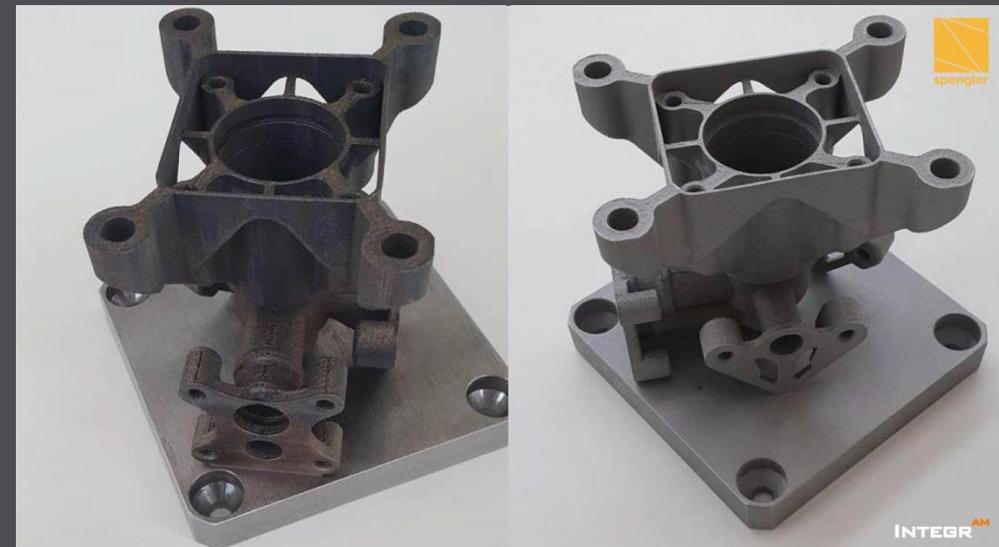
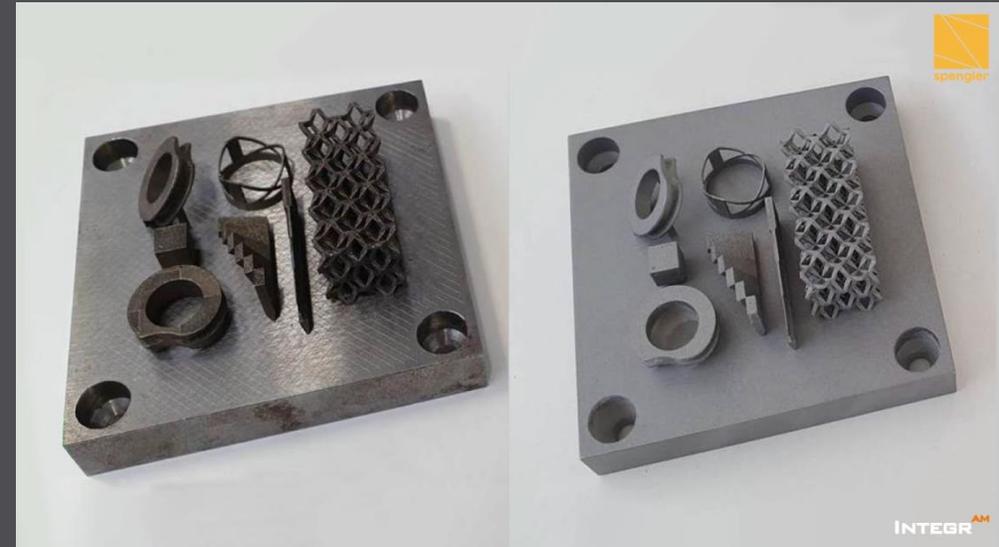
For MBJ and SLM **metal parts**

- VibroBLAST Air combines the three-dimensional vector movement and the blasting to perform a **surface preparation** on metal parts.
- **Rugosity uniformation** between upskin, downskin and vertical walls
- **Time reduction** of SurfPRO Microfluid treatment up to 30%



Finishing

RUGOSITY REDUCTION AND
SURFACE PREPARATION



VIBROBLAST TECHNOLOGY

 WATCH NOW

DCK 01

The All-in-one SLS post processing tool

The definitive SLS post-processing solution for **midsized printers** and **high production environments**.



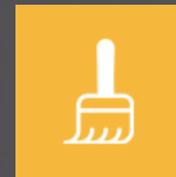
32 Liters PA12 Build
98 Objects processed

12 Minutes
MANPOWER



1: De-caking

AUTOMATIC, GENTLE
DESTRUCTION OF
YOUR BUILD



2: Cleaning

AUTOMATED
DEPOWDERING
PROCESS
(PATENTED)



3: Finishing

SURFACE
SMOOTHING
CYCLES



4: Powder recovery

EFFICIENT USED POWDER
RECOVERY, WITH
AUTOMATIC SIEVING



5: Mixing

2
CYCLES, *OPTIONAL*
MIXING SYSTEM

DCK 01

The All-in-one SLS post processing tool

The definitive SLS post-processing solution for **midsized printers** and **high production environments**

RETURN-ON-INVESTMENT SIMULATION

ROI analysis, based on the **average hourly cost** of an additive manufacturing technician in Europe, to showcase the economic benefits of the adoption of an **automated post-processing tool**.

We based our simulation on the following **key elements**:

- The **time** needed to **manually break-out** a build and recover used powder
- The **time** needed to **manually sandblast** an average of 3-4 parts per each build-liter, and bringing them to the tumbling machine afterward
- The **economy** of not having to purchase every tool needed to process cake ad parts manually



For **32 liters'** daily production
EG: 1 X PRODWAYS PROMAKER P1000 X
OR 2 X EOS FORMIGA VELOCIS

BREAK EVEN: 15 MONTHS

For **69 liters'** daily production
EG: 1 X EOS P396
OR 1 X FARSOON 403P

BREAK EVEN: 10 MONTHS

For **85 liters'** daily production
EG: 1 X EOS P396
+ 1 X EOS FORMIGA VELOCIS

BREAK EVEN: 7 MONTHS

INTEGR^{AM} DCK 01

The all-in-one
SLS[®] and MJF[®] Post Processing Tool



1: De-caking

AUTOMATIC, GENTLE
DESTRUCTION OF YOUR BUILD



2: Cleaning

AUTOMATED DEPOWDERING PROCESS
(PATENTED)



3: Finishing

SURFACE SMOOTHING CYCLES



4: Powder recovery

EFFICIENT USED POWDER RECOVERY,
WITH AUTOMATIC SIEVING



5: Mixing

2-CYCLES, *OPTIONAL* MIXING SYSTEM



EcoSonic

Multifunction ultrasonic cleaner

The **ECOSONIC** systems have been developed to perform **automatic ultrasonic cleaning**.



Automated

Washing, Rinsing and Drying



Special projects

SurfShot Vibro shot peening systems

For Compressive Residual Stress values gain



Initial C.R.S. 250 Mpa



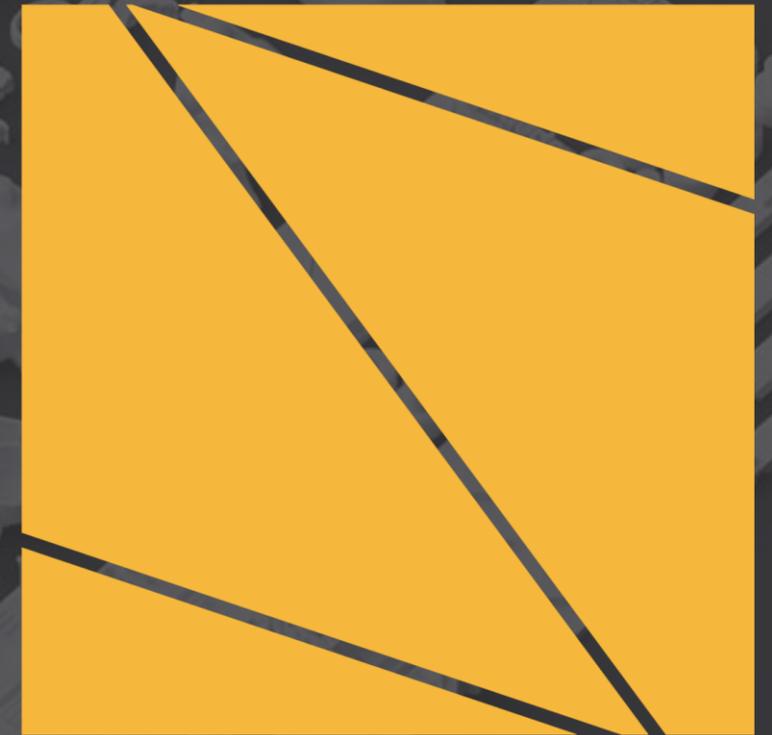
Final C.R.S. 550 Mpa
Final R.A. 0,9 microns

Binder Jetting AISI 316 parts, processed with the SurfPro Microfluid before being treated with the SurfShot system



THANKS FOR WATCHING

Contact us at info@spengler.tech



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