

# *Additive Manufacturing Process*

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- Introduction to the Additive Manufacturing Process
  - Machine - The M080 Laser Sintering Machine
  - Materials - Advanced Metal Powders
  - Process - DMLS Process Parameters
  
- Precious Part Printing
- Precious Part Post Processing
  
- Conclusions

## ➤ What is Additive Manufacturing

3D printing or **additive manufacturing** is a process of making three dimensional solid objects from a digital file. The creation of a 3D printed object is achieved using **additive** processes. In an **additive** process an object is created by laying down successive layers of material until the entire object is created.

As opposed to subtractive manufacturing processes ...

DMLS – Direct Metal Laser Sintering (Cooksongold)

# Introduction

Design

**FutureFactories.com**

Cad Preparation



Part Printing



Part Post Processing



Business Model / Supply Chain



DMLS  
Production  
is a very  
interdependent  
process

DMLS

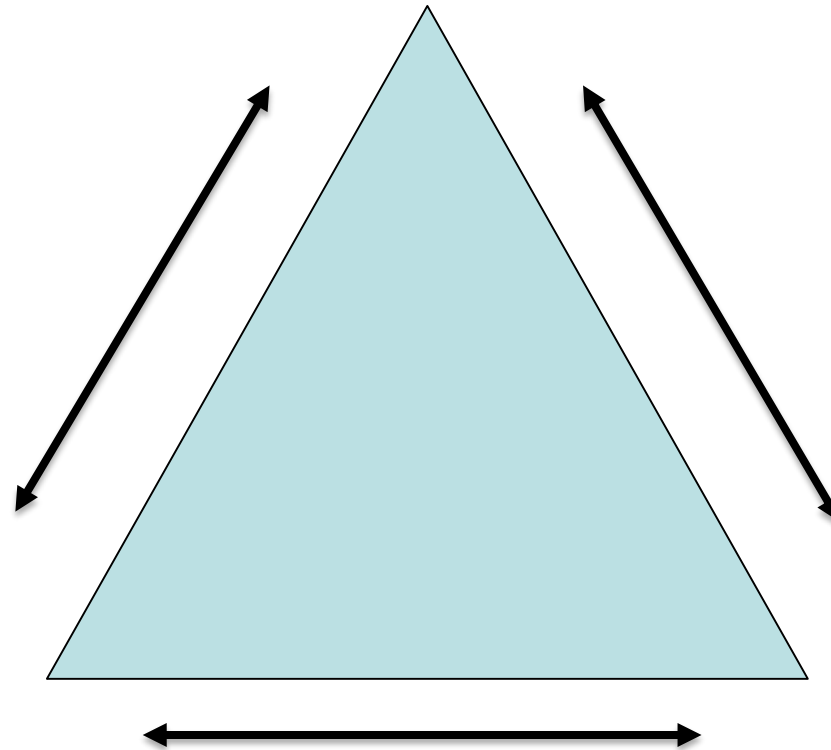
Production

is a very

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process

Process



Material

Machine

Joint Venture between Cooksongold & EOS – began 2011

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The objective was to bring additive manufacturing using precious metals to the jewellery and watch industries

EOS – additive manufacturing MACHINE knowledge and expertise

Cooksongold – precious metals MATERIAL knowledge and expertise

Cooksongold & EOS – PROCESS development for Jewellery and Watch applications

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January 2015 – EOS / Cooksongold M080 released for sale

Designed from the ground up as a additive manufacturing platform for precious metals with a focus on part quality and metal accountability



## Technical data

Building volume  $\varnothing$ 80 mm x 100 mm

Laser type Yb-fibre laser, 100 W

Precision optics F-theta-lens, high-speed scanner

Scan speed up to 7.0 m/s (23 ft./sec)

Focus diameter Less than 30  $\mu$ m

External gas supply 4.000 hPa; 50 l/min (58 psi; 1.8 ft<sup>3</sup>/min)

## Power

Power supply 13 A

Power consumption maximum 2.3 kW

## Dimensions

(B x D x H) 800 mm x 950 mm x 1850 mm

Recommended min 1 m x 3 m x 2.5 m installation space

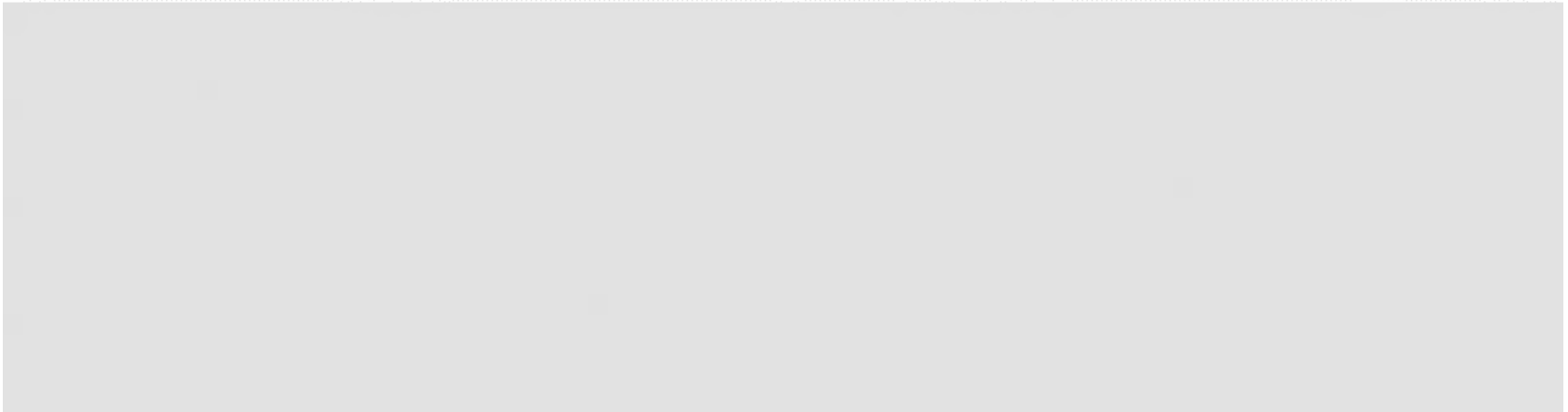
Weight 580 kg

## Data preparation

Software EOS RP Tools, Offline PSW

CAD interface STL

Network Ethernet

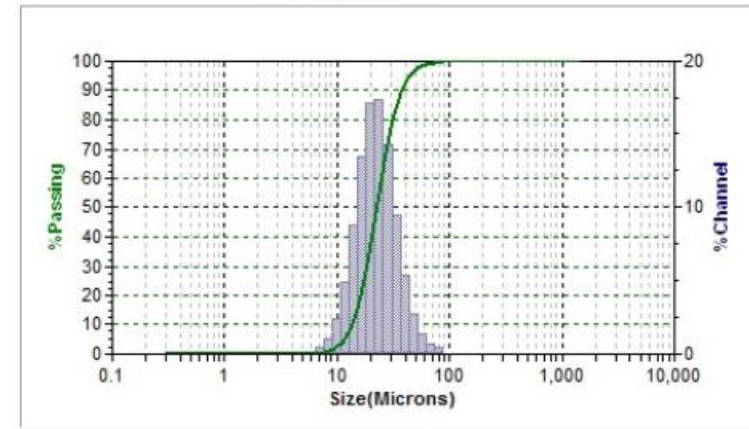
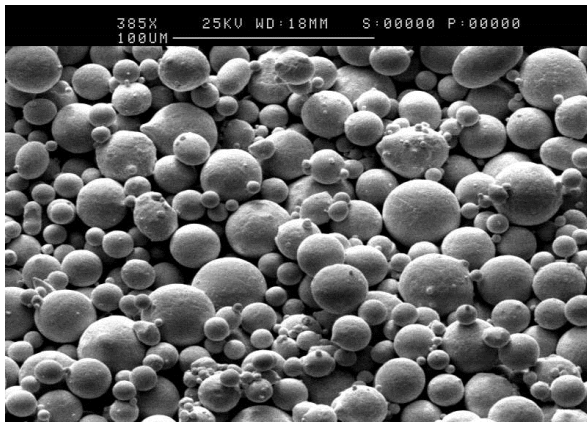




# Advanced Metal Powders

## Description:

Advanced Metal Powders from Cooksongold are a collection of specific gas atomised alloys developed for the Direct Metal Laser Sintering (laser melting) process. The spherical powders are adapted to work in any of the available laser melting machines on the market and have a high flowability ensuring a quality surface on DMLS parts.



M080 machine processing parameters have been developed and released to ensure a robust and reliable process capable of repeatedly producing parts of a consistent quality that is viable for jewellery and watch production

Material Processes Currently Available

18 Kt Yellow 3N  
18 Kt Red 5N  
18 Kt White

Material Processes Under Development

950 Platinum / Ru  
Sterling Silver

Material Processes Planned

Full range of gold alloys / colours  
Palladium alloys  
Other precious metal alloys

The Cooksongold role in the Precious Project is to produce test parts that are used by the project partners to investigate various aspects of the additive manufacturing part production process

Support development and understanding of additive manufacturing design rules and guidelines specifically related to precious metals processing

Support development of software support structure strategies that allow for efficient production of precious metal additive manufactured parts

Support development of mass finishing techniques to efficiently process precious metal additive manufactured parts to a acceptable standard for the jewellery and watch industries

Support investigation of precious metal additive manufacturing supply chain requirements to prove that additive manufacturing is a viable business alternative for the jewellery and watch industry

## What have we learned ?

Precious metal jewellery and watch parts can be designed to take full advantage of the benefits of the additive manufacturing process

Software tools have been developed that support efficient production of precious metal jewellery and watch parts. Support structure strategies have been developed that meet the functional needs of the manufacturing process, can be easily removed, and do not have a significantly negative impact on the quality of the parts that can be produced

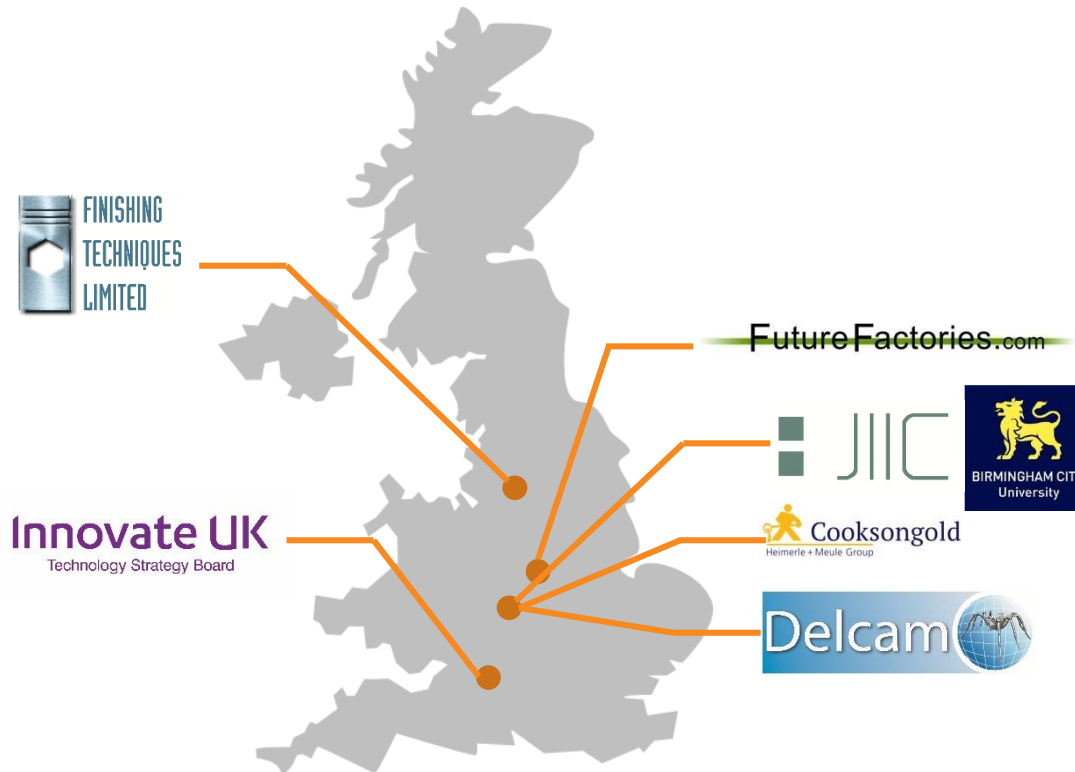
Mass finishing techniques have been developed that can support the production of high quality precious metal additive manufactured parts

The precious metal additive manufacturing process can be used to produce high quality jewellery and watch parts in an efficient and cost effective manner

Thank You

Please visit our table in the front lobby

For more information:  
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