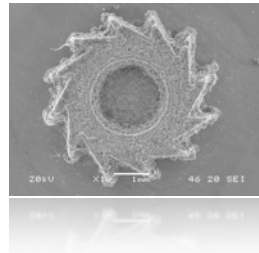


MANUDIRECT TECHNICAL DATA

Maximum build size	20 x 20 x 20 mm (W x D x H)
Model-to-Part accuracy	50 µm
Beam power	2 – 100 W (constant)
Beam spot size	120 – 180 µm
Laser scanning rate	100 – 200 mm/min
Nano-phased powder size	15 – 30 µm
Powder feed rate	0.4 – 5.0 L/min of Argon
No. of powder feeders	1 – 6
Cooling	Active
Power supply	220V, 16A, 3,5 kW
Size and weight	1850 x 1500 x 2200 mm (W x D x H), 1700 kg
Accuracy Integrated Multifocus Measurement System	10µm on the 3 axes in a minute
Accuracy Integrated Confocal Measurement System	3µm on Z-axis
Process computer CAD interface	PC
CAD interface	Standard: STL
Network	Ethernet 10/100/1000



A 12-edge micro-reamer in SS AISI420 for a biomedical device.

MANUDIRECT s.r.l., via S. Diaz, 21, 31100 Treviso, Italy

Phone: +39 0422 447354 | Fax: +39 0422 447319 | info@manudirect.eu

manudirect

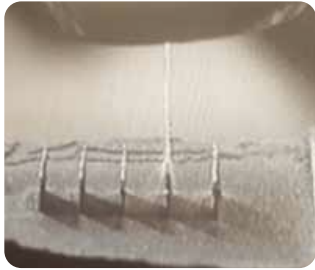
Direct Laser Sintering Micro-Manufacturing

Accuracy Gradient Material
High resolution Laser Sintering
Micro precision
Multimaterial
 In Line Process Control Virtual Database of Materials



THE NEW MANUFACTURING ERA: VIRTUAL DESIGN TO FUNCTIONAL PRODUCTS.

The Manudirect direct laser sintering micro-manufacturing machine is a new answer to industry demand in terms of rapid prototyping and manufacturing of mechanical parts, which allows to realize virtual engineering concepts and designs into real products in one step, without the need of prototyping stages.



- Innovative features:**
- * Nano-structured powder focusing technology;
 - * Multiple powder feeders for agglomerated powders (<math><15\ \mu\text{m}</math>);
 - * Nano-phased materials (patented technology);
 - * Virtual engineering material design SW;
 - * CAD-CAM Slicing SW;
 - * In-line geometrical monitoring systems.

In-line monitoring system

CAD-CAM Slicing SW

Material Design SW

Powder Feeders

Real time control SW

Powder focusing technology

The MANUDIRECT Technology

The Manudirect direct laser sintering micro-manufacturing platform has been designed to manufacture solid sintered objects layer by layer, under a controlled Argon atmosphere.

The laser sintering process allows to keep unchanged the nano-phased powder properties into the final object. The accuracy of the shape comes from a CAD-CAM Slicing SW and is controlled by a real time control SW.

Further benefits

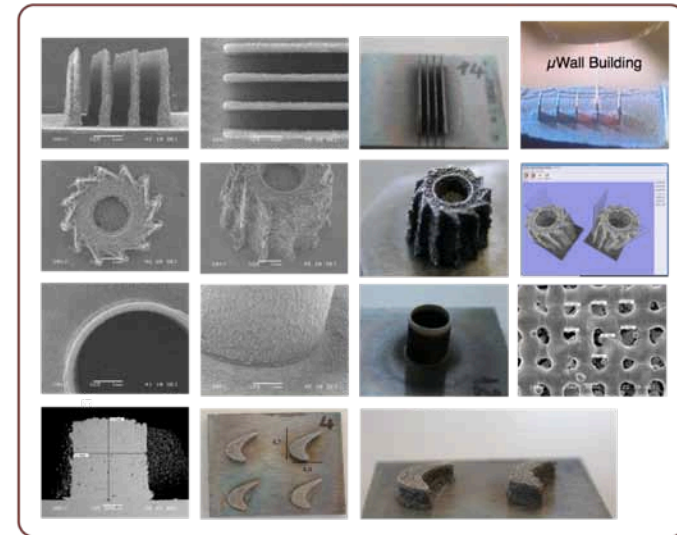
This innovative manufacturing technology is able to produce fully dense objects with high shape accuracy, better than 50 μm , and enhanced mechanical properties. Further benefits are:

- Capability to manufacture multimaterial structures (gradient materials) thanks to the multiple powder feeders.
- Feasibility of a double production scheme:
 - high resolution-low productivity;
 - high productivity-low resolution.

Applications

A wide range of industrial applications is possible:

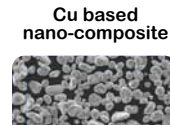
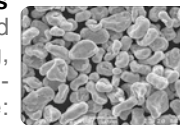
- * Mechanical components;
- * Machining and Milling tools;
- * Bio-medical devices;
- * Aeronautics and power generator;
- * Hi-Tech devices;
- * Structures with controlled micro-porosities.



Nano-Structured Powder Materials

Several systems of nano-phased powders for direct manufacturing, developed with a high energy ball-milling technology, are available: Metal Ceramic Composites, Stainless Steel, Ni-based systems, W- based systems.

SS AISI 420



FeCu nano-composite

