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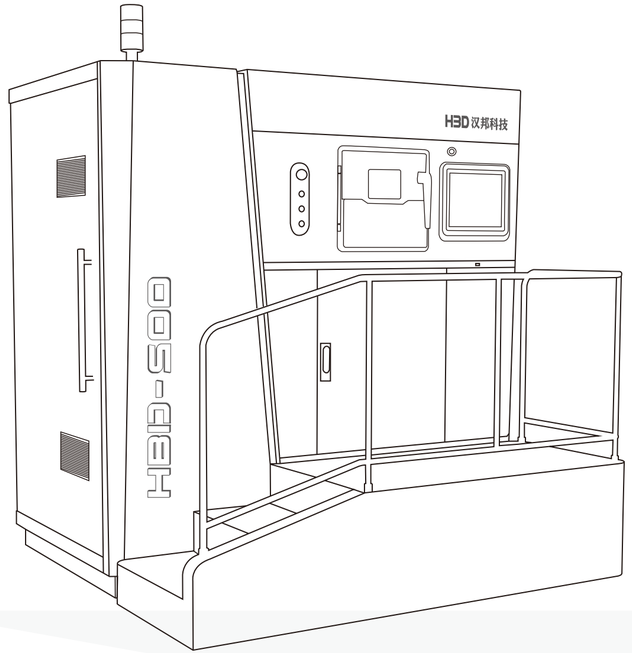

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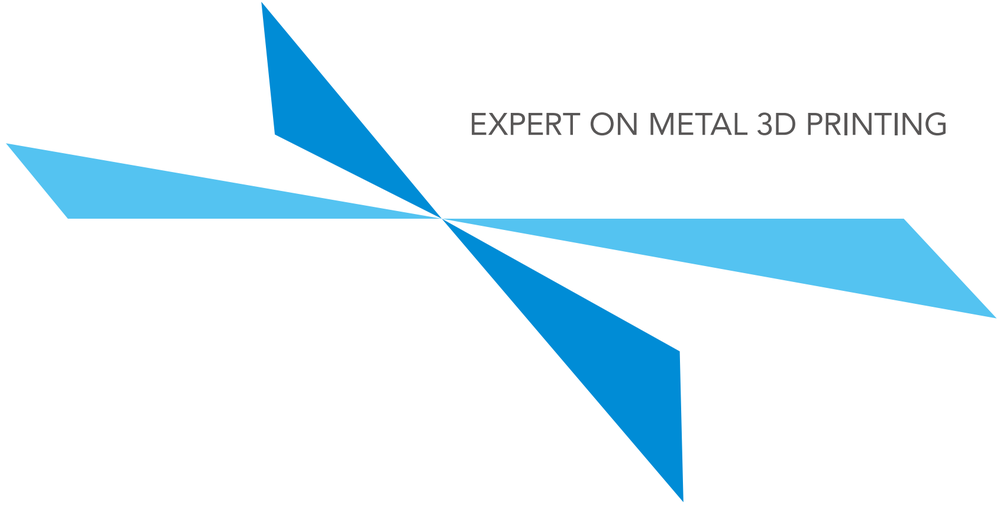
EXPERT ON METAL 3D PRINTING


EXPERT ON METAL 3D PRINTING

Company Introduction

Company Vision:
A respected company of digital intellectual technology

Core Value:
Innovation-driven, Excellent-quality, Integrity-base, Sharing and Multi-win.

Company DNA:
Expert on Metal 3D Printing

HBD, headquartered in the beautiful city of Zhongshan, with an international branch in Shanghai, is among the first companies in China to commercialize the metal 3D printing (SLM) equipment with R&D, production, sales, and application, provides high quality and full-range metal 3D printing solutions to customers.

In 2007, the HBD founding team stepped into the metal 3D printing industry. With over 10 years' experience of technology application, accumulation and maturity, HBD has been innovating new generations of SLM 3D printing equipment's software, control system, and technical database unremittingly and obtained more than 100 technical patents and over 20 software copyrights, as well as accumulated powerful expert resources. Relying on the rich experience of market service, combined with innovative modern operation and manage-ment concept, HBD has gained a good market share and the public praise. We firmly believe that only stick to the original intention can lead to the bright end.

HBD family devote themselves to be experts in metal 3D printing industry, with the rich and leading-edge technology application and engineering strength, better serving Aerospace, Medical & Dental, Orthopedics, Mold & Die, Automobile, Jewelry, Education & Scientific Research, Personalized Customization and many other industries, to create the greatest value for our customers continuously.

Milestone

2007
HBD founder team formally stepped into 3D Printing field from 2007.

2008
HBD devoted himself to the Metal 3D Printing equipment's R&D from 2008.

2013
Rongbang, HBD predecessor, successfully launched the industrial-grade Metal 3D Printer to the market in 2013.

2014
The first industrial-grade Metal 3D Printer was deliveried to customer in 2014, which still running steadily.

2015
Formally change company name to HBD in 2015, new stable & high precision Metal 3D Printers debuted in market.

2017
Move to new building and set up Shanghai company for new fields application and overseas business layout.

2019
Launched multi-lasers and larger printing size of industrial-grade SLM Metal 3D Printers.

Future
3D printing will be more intelligent, and utilized in more fields.

Patent and Software Copyright

Granted Patents

Software Copyrights

Strict Testing and Quality Control

190+ 项过程检验

190+ Process Tests

30+ 项出厂检验

30+ Factory Inspections

Cooperation with top domestic and foreign suppliers, strictly control parts of high quality with high standards; over 100 items of raw materials inspections, process test and final inspection, along with long-time test to ensure the quality of each equipment is optimized and the same.

Safe and Stable Equipment

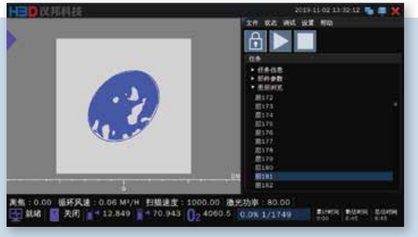
- Years' experience in equipment R&D and production bring a large customer base, and highly appreciated equipment quality.
- Dozens of software and hardware security technologies ensure the safety of personnel, equipment and products.
- Long-life multi-stage purification cycle system with independent core deaeration, filter humidification treatment, high efficiency backblowing and other core functions ensure safe use of filter and avoid frequent replacement of filter.
- Excellent chamber seal and chamber atmosphere protection provide lower gas consumption and shorter print preparation time.
- Optimized air circulation in the chamber and automatic air volume monitoring ensure continuous high-quality printing.

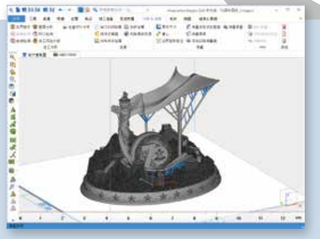
Efficient and Accurate Control System

Brand new human-computer interaction interface supports one-click automatic printing, which displays information more intuitively, presents more convenient operation mode, and record more detailed printing data.

Fast and efficient full-range calibration software provides micron-level calibration accuracy, and secondary calibration is available, ensuring long-term high-precision printing.

Professional Customized Version of Data Processing Software





Equipment and Operation Software

- One-click start, easy to operate
- Multiple security checks
- Complete system operation log monitoring
- Automatic data detection
- Accurate printing time

Data processing software

- One-click automatic layout
- Automatic support generation
- Excellent laser scanning path planning
- Short data processing time

HBD-80

Equipment Features

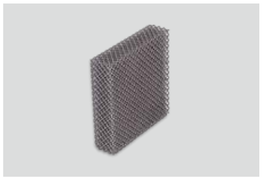
With open systems of all functions, using round base plate, HBD-80 could start printing with a small amount of powder, which is a high cost efficient industrial-grade metal 3D printer.

HBD-80 could be used to build a new type of training platform for education & scientific research, set up new disciplines, conduct industry-university-research cooperation, and new 3D printing process and powder material basic research.

Technical Parameters

Forming Size	ϕ120mm × 80mm
Laser Power	200W
Layer Thickness	10μm–40μm
Scanning Track Width	40μm–80μm
Scanning Speed	≤10000mm/s
Oxygen Content	≤100PPM
Protective Atmosphere	Integral sealed, automatic monitoring of oxygen content, recycling cleaning and collection coefficient ≥ 99%.
Relative Density	Nearly 100%.
Typical Accuracy	0.05–0.01mm
Metal Power	Stainless steel, Cobalt–chrome alloy, Tool steel, Titanium alloy, High temperature alloy, Hastelloy, and some precious metals.
Software Package	Full opening within hardware allowed.
Processing Parameter Package	Equipped and customizable.

Printed Parts



HBD-100

Equipment Features

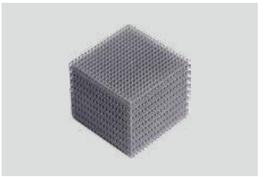
Ergonomic design, rigorous internal structure, and sub-vacuum sealing molding chamber ensure equipment safety and stability. Printed parts are precise in dimensions, with smooth surface and high density.

HBD-100 could be applied in the fields of powder metallurgy, dentistry, education and scientific research and customization.

Technical Parameters

Forming Size	105mm × 105mm × 100mm
Laser Power	200W
Layer Thickness	10μm–40μm
Scanning Track Width	40μm–80μm
Scanning Speed	≤10000mm/s
Oxygen Content	≤100PPM
Protective Atmosphere	Integral sealed, automatic monitoring of oxygen content, recycling cleaning and collection coefficient ≥ 99%.
Relative Density	Nearly 100%.
Typical Accuracy	0.05–0.01mm
Metal Power	Stainless steel, Cobalt-chrome alloy, Tool steel, Titanium alloy, High temperature alloy, Hastelloy, and some precious metals.
Software Package	Full opening within hardware allowed.
Processing Parameter Package	Equipped and customizable.

Printed Parts

HBD-150

Equipment Features

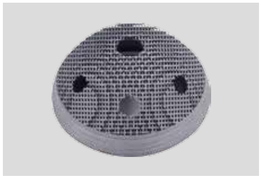
The model is customized for titanium partial dentures printing. With round base plate, HBD-150 is equipped with efficient and safe independent atmosphere purification system, sealed glove structure. It also reserves sealed powder adding and powder clearing holes, which could enable adding powder and clearing powder without opening the chamber door, providing safe and stable titanium printing solutions.

HBD-150 could be applied in fields including dentistry, prototype, education and scientific research and customization.

Technical Parameters

Forming Size	ϕ159mm × 100mm
Laser Power	200W
Layer Thickness	10μm–40μm
Scanning Track Width	40μm–80μm
Scanning Speed	≤10000mm/s
Oxygen Content	≤100PPM
Protective Atmosphere	Integral sealed, automatic monitoring of oxygen content, recycling cleaning and collection coefficient ≥ 99%.
Relative Density	Nearly 100%.
Typical Accuracy	0.05–0.01mm
Metal Power	Stainless steel, Cobalt–chrome alloy, Tool steel, Titanium alloy, High temperature alloy, Hastelloy, and some precious metals.
Software Package	Full opening within hardware allowed.
Processing Parameter Package	Equipped and customizable.

Printed Parts



HBD-200

Equipment Features

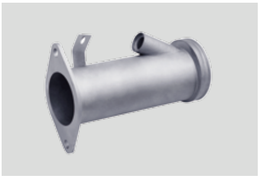
The model is customized for titanium partial dentures printing in a big plate form. With dual laser and dual galvanometer, HBD-200 is equipped with efficient and safe independent atmosphere purification system, sealed glove structure, interface for powder addition and powder cleaning operation, which could enable adding powder and cleaning powder without opening the cabin door, providing safe and stable titanium printing solutions.

HBD-200 could be applied in fields including dentistry, prototype, education and scientific research and customization.

Technical Parameters

Forming Size	270mm × 170mm × 120mm
Laser Power	200W × 2
Layer Thickness	10μm–40μm
Scanning Track Width	40μm–80μm
Scanning Speed	≤10000mm/s
Oxygen Content	≤100PPM
Protective Atmosphere	Integral sealed, automatic monitoring of oxygen content, recycling cleaning and collection coefficient ≥ 99%.
Relative Density	Nearly 100%.
Typical Accuracy	0.05–0.01mm
Metal Power	Stainless steel, Cobalt–chrome alloy, Tool steel, Titanium alloy, High temperature alloy, Hastelloy, and some precious metals.
Software Package	Full opening within hardware allowed.
Processing Parameter Package	Equipped and customizable.

Printed Parts



HBD-280 / HBD-280T

Equipment Features

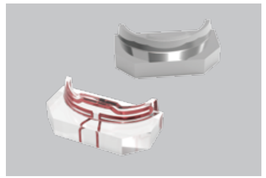
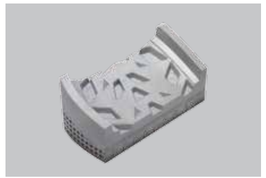
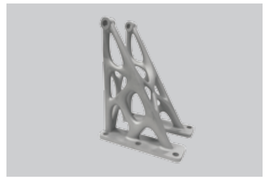
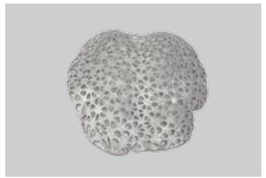
With mainstream forming size, HBD-280 series is equipped with stable and accurate powder recoating system, as well as high efficient and accurate laser optical path & management system. Collaborating with intelligent sensing and monitoring of system, the series provide all-round feedback.

HBD-280 series is designed for die & mold development, medical purposes, education & scientific research, automotive manufacturing etc.

Technical Parameters

Forming Size	250mm × 250mm × 300mm
Laser Power	500W / 500W × 2
Layer Thickness	20μm-100μm
Scanning Track Width	70μm-200μm
Scanning Speed	≤7000mm/s
Oxygen Content	≤100PPM
Protective Atmosphere	Integral sealed, automatic monitoring of oxygen content, recycling cleaning and collection coefficient ≥ 99%.
Relative Density	Nearly 100%.
Typical Accuracy	0.05~0.2mm
Metal Power	Stainless steel, Cobalt-chrome alloy, Tool steel, Titanium alloy, High temperature alloy, Aluminum alloy, Hastelloy, Tungsten, Tantalum and some other refractory metals.
Software Package	Full opening within hardware allowed.
Processing Parameter Package	Equipped and customizable.

Printed Parts

HBD-500 / HBD-500T

Equipment Features

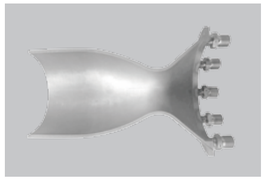
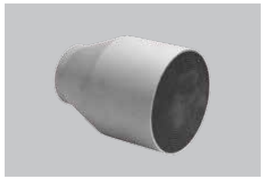
With modular function of mobile production units, unique powder recycling system, highly integrated post-processing function, HBD-500 series is perfectly intelligent and 7×24h working without interrupting printing, with double lasers and double vibration mirrors. This high efficiency meets the requirements of prototype manufacturing to small batch production.

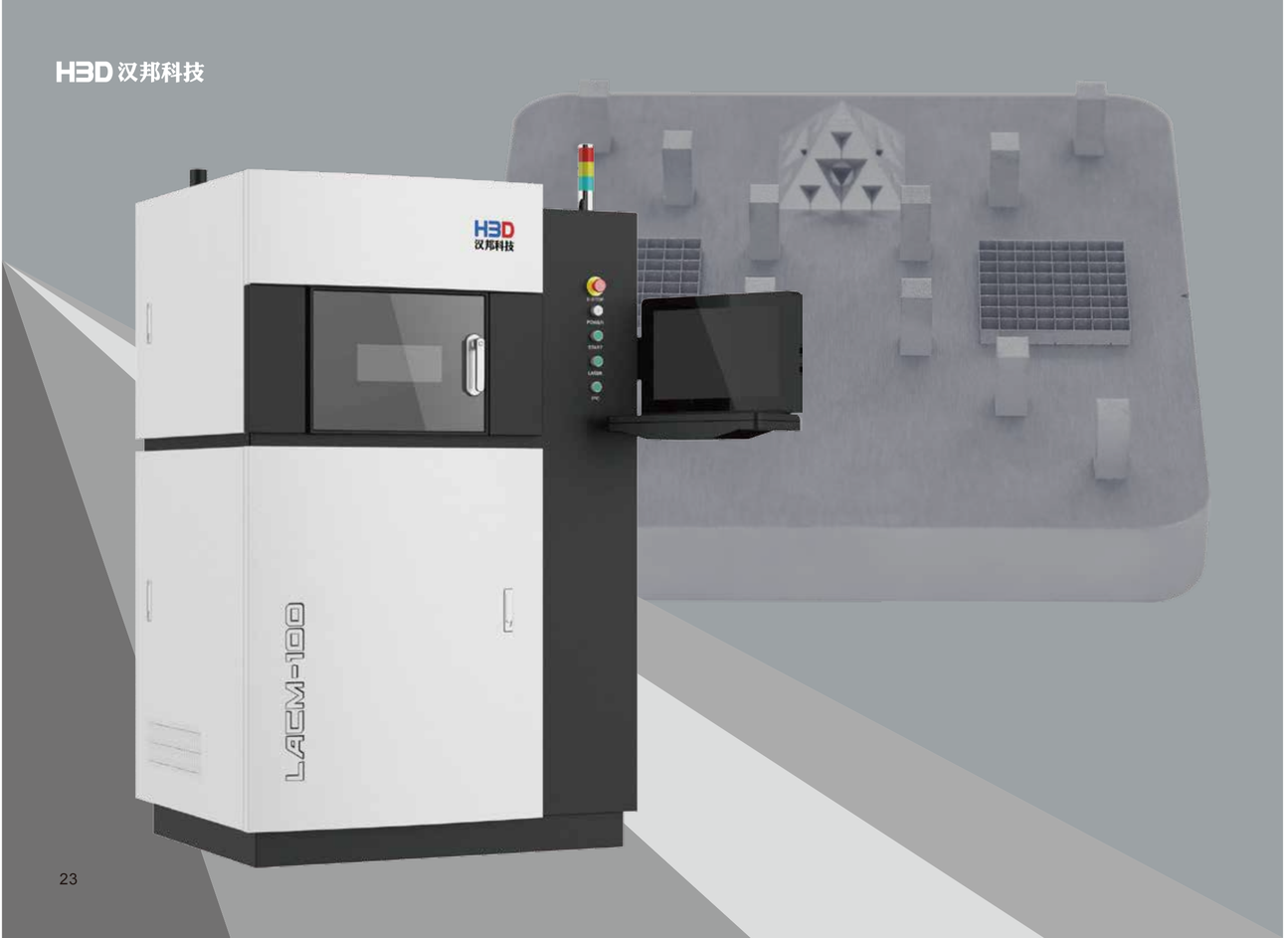
HBD-500 series could be applied in mold manufacturing, aerospace, medical fields, automotive parts manufacturing etc.

Technical Parameters

Forming Size	400mm × 435mm × 435mm
Laser Power	500W / 500W × 2
Layer Thickness	30μm-100μm
Scanning Track Width	70μm-200μm
Scanning Speed	≤7000mm/s
Oxygen Content	≤100PPM
Protective Atmosphere	Integral sealed, automatic monitoring of oxygen content, recycling cleaning and collection coefficient ≥ 99%.
Relative Density	Nearly 100%.
Typical Accuracy	0.05~0.2mm
Metal Power	Stainless steel, Cobalt-chrome alloy, Tool steel, Titanium alloy, High temperature alloy, Aluminum alloy, Hastelloy, Tungsten, Tantalum and some other refractory metals.
Software Package	Full opening within hardware allowed.
Processing Parameter Package	Equipped and customizable.

Printed Parts

LACM-100

Equipment Features

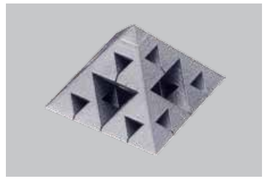
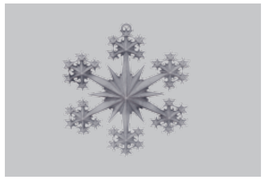
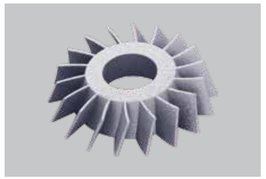
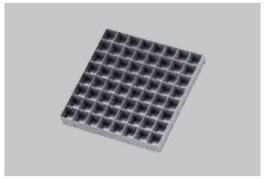
The model utilizes additive manufacturing and micro-cutting into new technology, which takes full advantage of selective laser melting and ultra-fast laser cutting (for example picosecond and femtosecond technology). With these characteristics, LACM-100 realizes the surface precision of complex structural parts up to the micron level, effectively reduces the surface roughness, perfectly solves the problem of hole corner collapse.

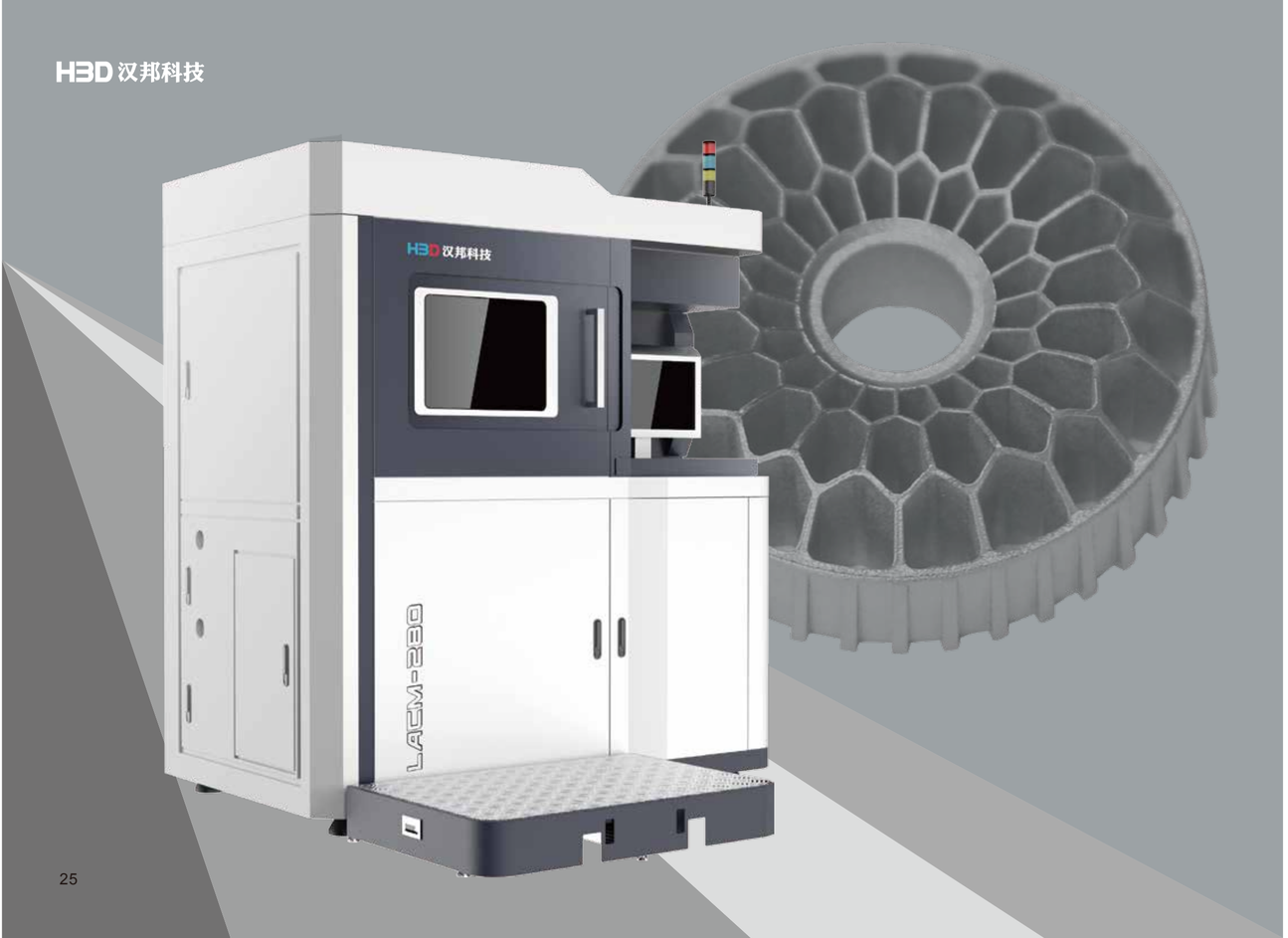
LACM-100 could be applied to precision mold and die, dental implants, precise internal cavity final parts and microstructure parts etc.

Technical Parameters

Forming Size	105mm × 105mm × 100mm
Laser Power	SLM: 200W & Cutting: 50W
Layer Thickness	10μm–40μm
Scanning Track Width	30μm–80μm
Scanning Speed	≤10000mm/s
Oxygen Content	≤100PPM
Protective Atmosphere	Integral sealed, automatic monitoring of oxygen content, recycling cleaning and collection coefficient ≥ 99%.
Relative Density	Nearly 100%.
Typical Accuracy	0.01–0.1mm
Metal Power	Stainless steel, Cobalt-chrome alloy, Tool steel, Titanium alloy, High temperature alloy, Hastelloy, and some precious metals.
Software Package	Full opening within hardware allowed.
Processing Parameter Package	Equipped and customizable.

Printed Parts



LACM-280

Equipment Features

The model utilizes additive manufacturing and micro-cutting into new technology, which takes full advantage of selective laser melting and ultra-fast laser cutting (for example picosecond and femtosecond technology). With these characteristics, LACM-280 realizes the surface precision of complex structural parts up to the micron level, effectively reduces the surface roughness, perfectly solves the problem of hole corner collapse.

LACM-280 could be applied to high-precision and high precision and high degree of finish products printing, high precision molds production, and finally realizes the printed parts could be used directly.

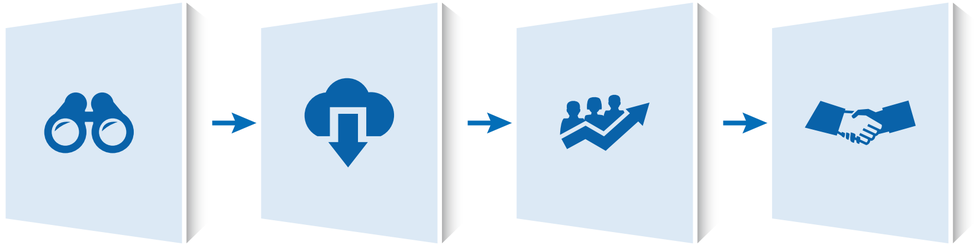
Technical Parameters

Forming Size	250mm × 250mm × 300mm
Laser Power	SLM: 500W & Cutting: 50W
Layer Thickness	20 μ m–80 μ m
Scanning Track Width	50 μ m–200 μ m
Scanning Speed	⩽7000mm/s
Oxygen Content	⩽100PPM
Protective Atmosphere	Integral sealed, automatic monitoring of oxygen content, recycling cleaning and collection coefficient ⩾ 99%.
Relative Density	Nearly 100%.
Typical Accuracy	0.01–0.1mm
Metal Power	Stainless steel, Cobalt-chrome alloy, Tool steel, Titanium alloy, High temperature alloy, Aluminum alloy, Hastelloy, Tungsten, Tantalum and some other refractory metals.
Software Package	Full opening within hardware allowed.
Processing Parameter Package	Equipped and customizable.

Printed Parts




User Collaborative AM Plan



Exploration

Collaborate customers to explore the application development, make AM design thinking realize the transition from 0 to 1.

Implementation

Based on customer needs, provide full set of customized AM solutions for the plant.

Upgradation

Optimizing production chain to increase capacity and product quality, integrate the inteligent and automated production mode to increase corporate revenue.

Cooperation

Developing deeper application and maintaining cooperation advancement and competitiveness, continue to create value for our partners.

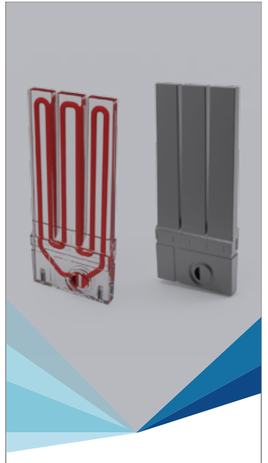
Application Introduction

Aerospace Application

Medical Field - Dental Products

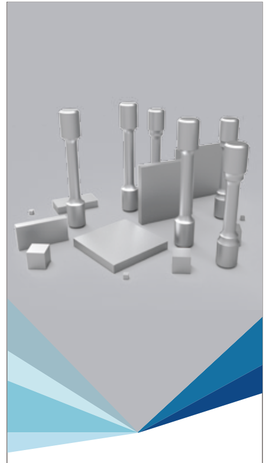
Medical Field - Orthopedic Products

Mould Manufacturing



Automotive Application

Customization



Education and Scientific Research

Medical Applications

INDUSTRY DEMANDS :

1. Tailored depend on the individual patient.
2. Achieve efficient customization / Save operation time / Reduce surgery risk.
3. Improve fitness of human mechanics and production integration.

METAL 3D PRINTING SOLUTIONS:

1. Ensure matching dearee of 3D printed parts with patient’ s bone through the accuracy establishment of model and the precise manufacturing.
2. Verify the as-fabricated parts, conduct surgery simulation and improve the cure rate.
3. Improve fitness of human mechanic of prosthesis and patient bones through fabrication of trabecular bones and porous structures.

Orthopedic Application Cases

INDUSTRY DEMANDS :

1. Manufacture dentures, stents and relevant dental products with high efficiency.
2. Meet the secret requirement of the high fitness of dental products and patients.

METAL 3D PRINTING SOLUTIONS:

1. Improve the fabrication effciency of dental products with more than 24h automated production.
2. Avoid compiex procedures and human errors and ensure high-quality production of dental products.

Dental Products

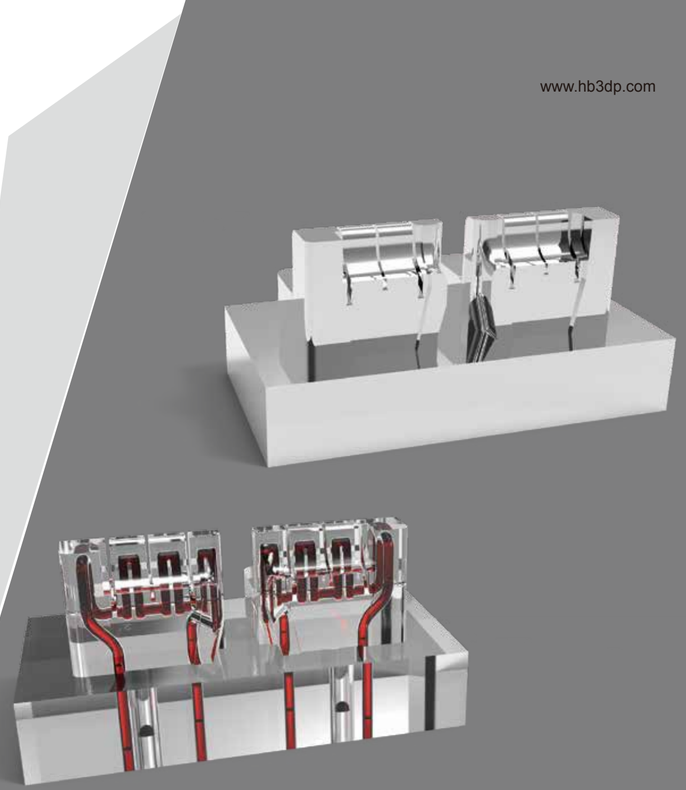
Mould Manufacturing Applications

INDUSTRY DEMANDS :

1. Shorten the injection cooling time and improve the efficiency of mold removal;
2. In solving the cooling process of the mold temperature can not be effectively controlled, resulting in the deformation of products caused by the uneven temperature of the mold.
3. Shorten mold development cycle and mold manufacturing cost.

METAL 3D PRINTING SOLUTIONS:

1. Directly print the mold containing the conformal channel, which has a larger cooling area and the cooling efficiency is high, and the production efficiency can be increased by more than 35%;
2. With the conformal cooling, the mold temperature is evenly distributed, effectively preventing the distortion of product warping, cracking flying edge, bubble sand eye and other product defects;
3. The metal 3D printing has realized the infinite design with less manual participation, the production cycle of the mould has been greatly shortened, and manufacturing cost has been reduced from multiple process.



Aerospace Applications

INDUSTRY DEMANDS:

1.Shorten the R&D cycle.
2. Integrate and fabricate the parts with complicated structure.
3. Improve the material utilization and reduce cost.
4. Achieve the goal of fabricating lightweight parts applied in aerospace components

METAL 3D PRINTING SOLUTIONS:

1. Improve R& D Efficiency: Manufacture without complex procedures and any molds or tools, convert design data into entities, shorten the shape and functionality verification cycle.
2. Manufature parts with complex structures: Have high freedom for the fabrication of complicated components.
3. Save material and reduce fabrication/post-treatment cost: Integrate the multiple parts into a functional component.
4. Fabricate lightweight components: Optimize the structures, reduce the weight and achieve the fabrication of lightweight components applied in aerospace industry.

Being a towering tree, root is fundamental,
Only root deep can grow strong,
Only strong can put up the world.

HBD - Expert on Metal 3D Printing