Pioneer.
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Meet the new generation of
Additive Manufacturing

InssTek

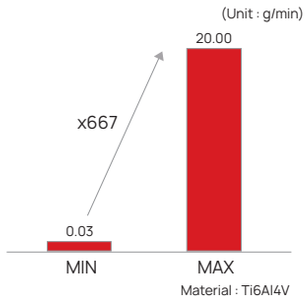
MX-Fab NEW product launch
DED Machine with DMT & 5-Axis AM CAM

Features

- Accurate & Stable feeder for multi material
- All in one system for fabrication
- Accurate CVM powder feeding system applied
- Easiest installation
- Effcient inert gas control system
- Compact size & effcient build volume

DMT | 2nd Gen AM Module | 5Axis Simultaneous

- Hexa feeding system for multi material
- Real time feedback control
- Feed rate range 0.03 - 20g/min (based on Ti)
- Multi material fabrication
- Minimum quantity control



Technical Data

	MX-Fab1
Laser type Ytterbium Fiber Laser	Max. 2,000 (Rack Mount Type)
X / Y / Z Stroke (mm) A / C Stroke (deg)	500 x 600 x 400 -100 ~ +100 / 360
Dimension (mm) Weight (kg)	1,450 x 1,950 x 2,350 3,000
Powder Feeding System	CVM Hexa-Powder Feeder
Control System	PC-based Control System with Touch Screen DMT® Closed Loop Feedback Control system
Inert Gas Control System	Optional

MX-Standard

DED Machine with DMT & 5-Axis AM CAM

Features

Highly functional component production, re-modeling, repairing and special coatings

Excellent mechanical properties

Commercial metal powders can be used

Enables manufacture of complex structures

Enables repair of parts

DMT | 2nd Gen AM Module | 5Axis Simultaneous

Technical Data

	MX-600	MX-1000	MX-Grande (custom)
Laser type Ytterbium Fiber Laser (W)	Max. 1,000	Max. 2,000	Max. 3,000
X / Y / Z Stroke (mm) A / C Stroke (deg)	450 × 600 × 380 -100 ~ +5 / 360	800 × 1000 × 680 -100 ~ +5 / 360	4000 × 1000 × 1000 -100 ~ +5 / 360
Control System	PC-based Control System with Touch Screen DMT® Closed Loop Feedback Control system		

Excellent mechanical properties

Metal parts printed by DMT® have superior mechanical properties, high density and fine microstructures.

Materials			UTS (MPa)	YS (MPa)	Elongation	Hardness (HRC)
H13 (SKD 61)	DMT®	Vertical	1,927	1,400	5%	54
		Horizontal	1,998	1,477	5%	
	Forging Part		1,821	1,385	9%	51

* The data represents the condition with no heat treatment

MX-Med

Metal Porous Coating machine

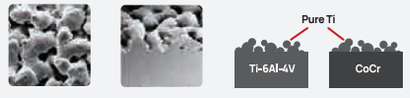
Features

Titanium porous structure application

MX-Med (Metal Porous Coating) was originally developed for application in orthopedic implant surface coating.

The system is currently being used for artificial knee & hip joint coating.

Porous Coating



MX-Lab

DED & Material research machine

Features

Simple system for easy entrance of DED

3-Axis system & DMT Technology

Focus on material research

More accurate powder feeding system (CVM)

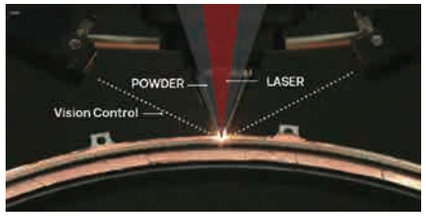
2nd generation AM module technology applied

DMT | 2nd Gen. AM Module | CVM Power System

DMT® Technology

The most precise DED technology

DMT®, Direct Metal Tooling, developed by INSSTEK is categorized as Direct Energy Disposition(DED) technology according to ASTM standards. Using 2 vision cameras, DMT technology analyzes and controls the height of the meltpool in realtime.



Applicable Materials for DMT

Titanium	CP Ti Gd2, Ti6Al4V	Hastelloy	22, 276
Steel	P20, P21, H13	Copper	Cu-Sn, Al Bronze
Stainless Steel	304, 316, 420	Cobalt	CoCr, Stellite 21, 25
Nickel	600, 625, 690, 713, 718		

Multi Optic

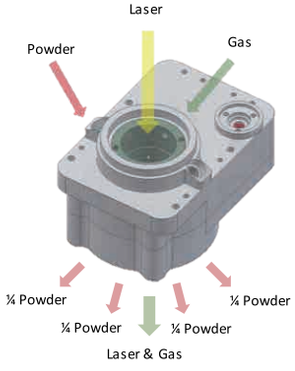
Cartridge type optic system

Type	Beam Size	Build Speed
SDM800	800um	4.3 cm^3/h
SDM1200	1200um	12 cm^3/h
SDM1800	1800um	36 cm^3/h

Active Splitter

Co-axial type powder splitter with power

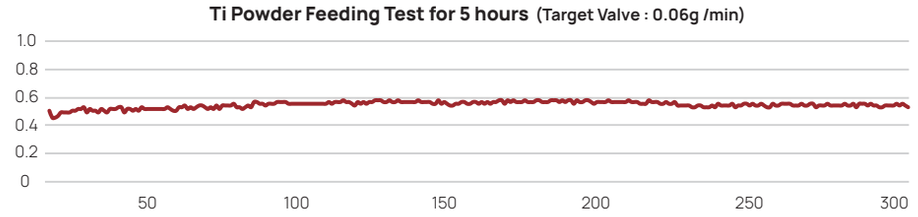
- Co-axial type powder splitter
- Small amount of powder can be divided evenly
- Easy to use (No need of calibration of mechanical adjustments)

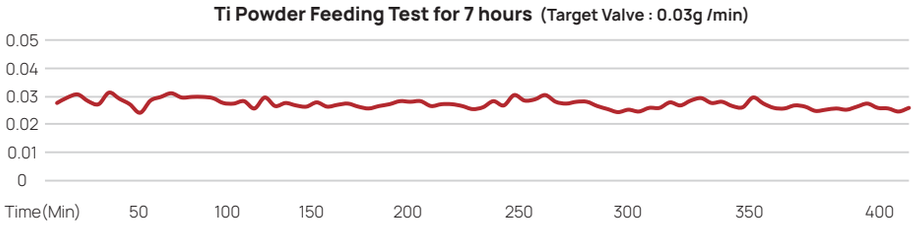


CVM Powder System

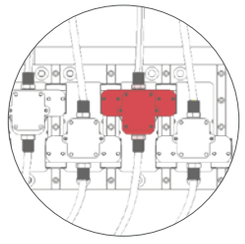
Next generation of powder feeding system

CVM (Clogged vibration method) powder feeder is an advanced type of powder feeding system. It has remarkably stable powder feed rate, a semi-permanent lifespan, and a broad feeding rate range. It can feed titanium powder from 0.1g/min to 10g/min with no hardware change. Also, the gravity powder supply method and direct powder supply method with gas is applicable in the DED process.

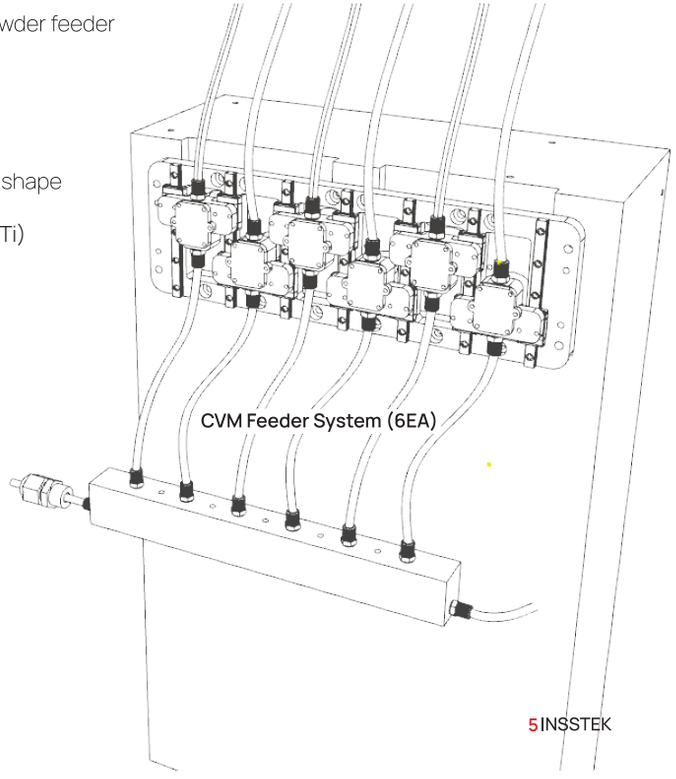




- CVM(Clogged Vibration Method) type powder feeder
- Feeds multi materials at the same time
- Gradually adjustable powder feed rate
- Not effected by metal powder ductility or shape
- Feed rate range 0.03 - 2g/min (based on Ti)
- Gravity / direct feeding available
- Impressively stable powder feed rate



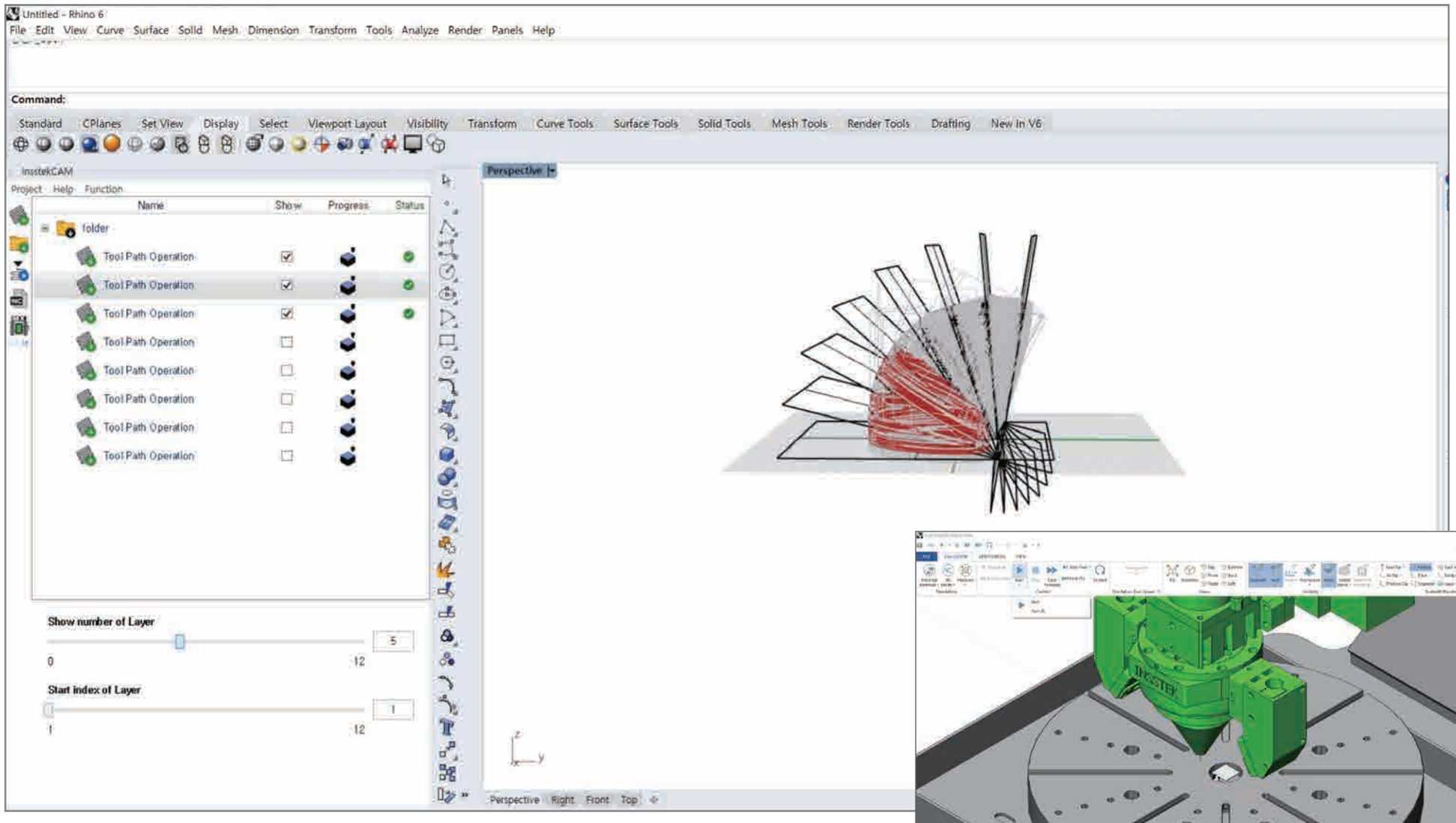
CVM Feeder Block



Simultaneous 5-Axis AM-CAM

Perfect Solution for Simultaneous 5-Axis AM-CAM

Simultaneous 5-Axis AM-CAM is one of the most important technology of INSSTEK's DED additive manufacturing. Combined with INSSTEK's years of know-how, Simultaneous 5-Axis AM-CAM enables us to overcome the limitations of existing DED technology. We are breaking the limits of additive manufacturing.



5-Axis AM ToolPath Generation

5-Axis AM Simulator

MX-Standard

5-Axis Sample

Made with Simultaneous 5-Axis CAM

Research done for gas pipes with Simultaneous 5-Axis motion. The cross section figure starts from a circle and gradually forms to a rectangle.

Material : SUS316

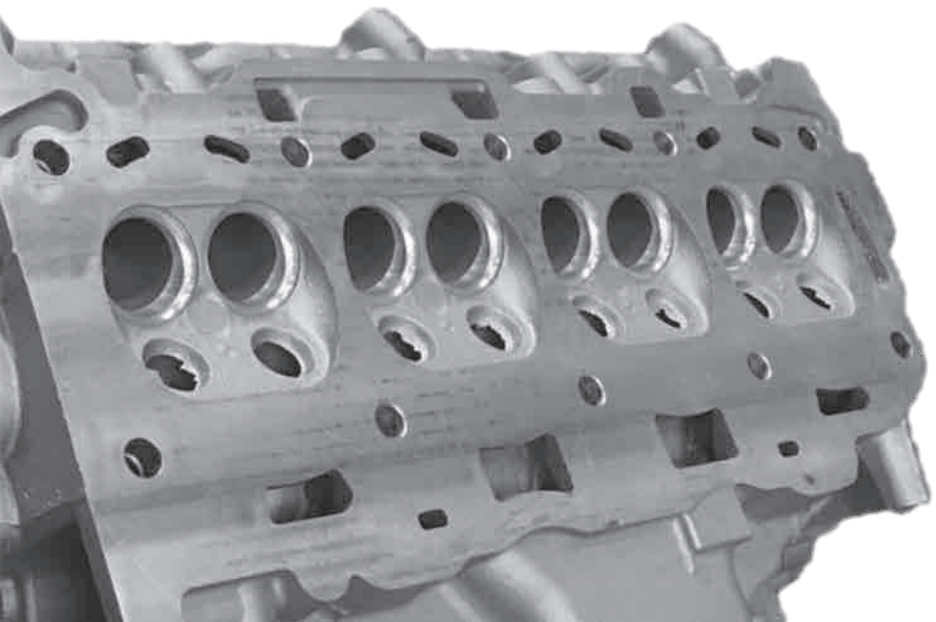
MX-Standard

Jet Engine Air Seal

Repairing for Korean Air Force

Restoration of damaged turbine engine part was required. Originally, restoration took a minimum of 3 months. INSSTEK reduced the cost and time dramatically.

Material : Ti-6Al-4V



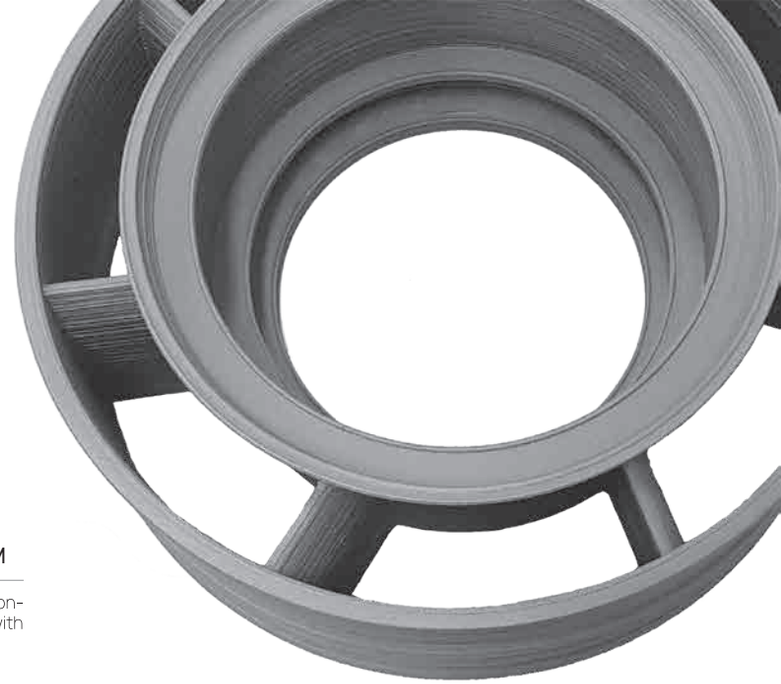
MX-Standard

Automobile Engine

Cladding on valve seat for fuel-efficiency

INSSTEK's AM technology increased fuel efficiency up to 2% of an automobile engine by cladding the valve seat of the intake port side of the engine.

Material : Classified



MX-Standard

Turbine Vane Ring

Made with Simultaneous 5-Axis CAM

Mechanical part for high temperature environments, made with titanium and manufactured with 5-Axis DED technique.

Material : Ti-6Al-4V

MX-Standard

Multi Material Valve

Bi-material technology for anti-corrosion

Research was conducted to make a new type over-lay valve using multi material. An inconel valve was manufactured using Simultaneous 5-Axis motion.

Material : SUS 316 (Outter)
Inconel 625 (Inner)

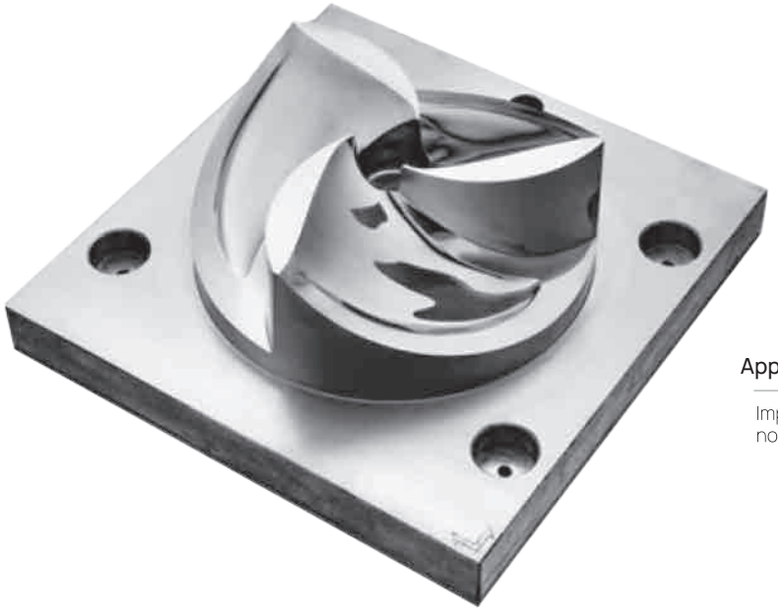
MX-Med

Artificial Joint

Porous coating process

In collaboration with a global leading artificial knee and hip joint manufacturer, INSSTEK developed a hip joint coating process which optimized operational efficiency, including delivery and cost management.

Material : CoCr & Ti-6Al-4V (Substrate)
Pure Ti (Porous Layer)



MX-Standard

Home Appliance

Application of 3D cooling channels

Improvements in cooling efficiency and noise reduction by production of a fan mold made by 3D cooling channels.

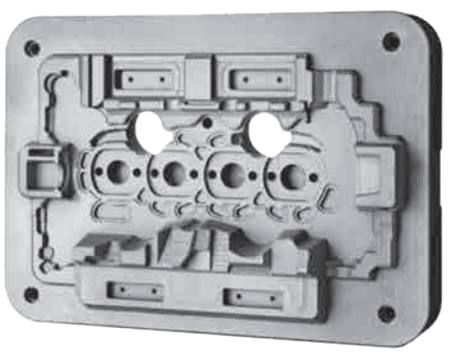
MX-Standard

Automotive Mold

Reconfiguration of plastic injection mold

Reduction of lead time and redesign cost by reconfiguration of plastic injection molds using DED technology.

Material : Classified



MX-Standard

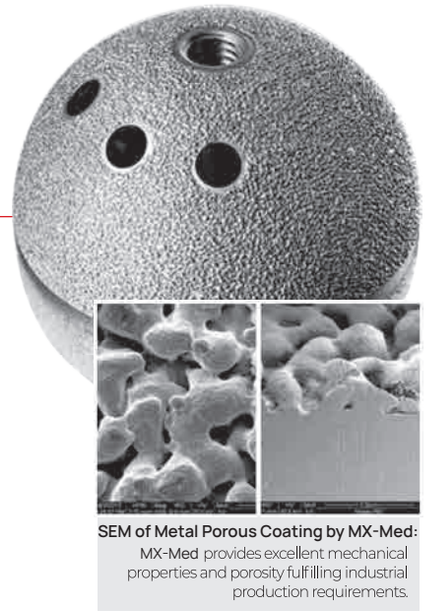
Automotive Mold

Corrossion-resistant material

30% life cycle enhancement by printing corrosion-resistant material on normal material substrate.

Coating Material : Hastelloy C-22

Creating innovative solutions for challenges in medical industries



SEM of Metal Porous Coating by MX-Med:
MX-Med provides excellent mechanical properties and porosity fulfilling industrial production requirements.

Examples of medical applications

IDEAL POROSITY
Surface roughness ensured with porosity higher than 60% and ideal porosity (pore size: 100-400um) that strengthens interfacial bonding between coating layer and substrate as well as biological fixation with bones

SUPERIOR CUSTOMIZATION
Entirely customizable for cups, knees, shoulders, ankles and more

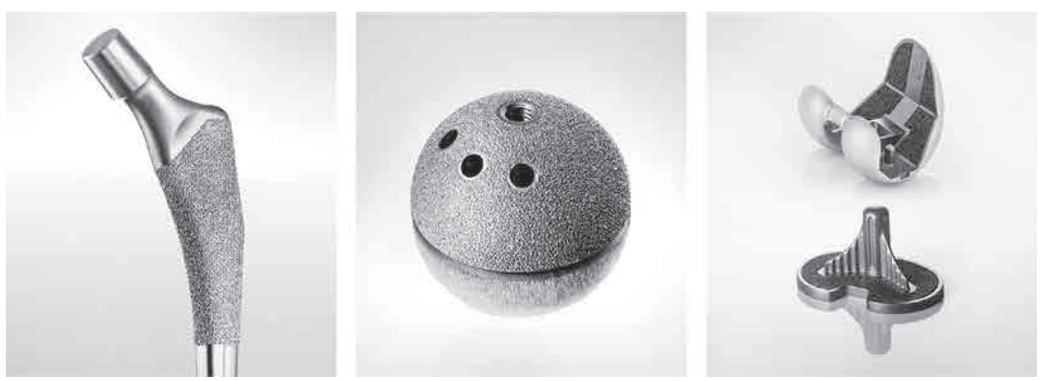
EXCELLENT MECHANICAL PROPERTY
The lowest oxygen index with an environmental chamber and MPC enables exceptionally high mechanical properties

USER FRIENDLY INTERFACE
Simple coating procedure with easy steps and easily controllable pore shape, thickness, roughness

ECONOMICAL ADVANTAGE
Cost effective compared with the conventional method and rapid fabrication

MINIMIZED HEAD MODULE
Minimized head module to avoid interference with the objects and optimized coating parameters including Ti alloy

COMPLEX PARTS PRODUCTION
Porous coating possible using the simultaneous 5-Axis motion



Medical Application

Porous coating of artificial hip joint and knee replacement