
Pioneer.
Realize.
Explore.
Meet the new generation of
Additive Manufacturing
InssTek

MX-Standard

DED Machine with DMT & 5-Axis AM CAM

Features

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

Excellent mechanical properties

Available using commercial metal powders

Enables to manufacture of complex shapes structure

Enables to repair parts

DMT | 2nd Gen AM Module | 5-Axis Simultaneous

Technical Data

	MX-600	MX-1000	MX-Grande (custom)
Laser type Ytterbium Fiber Laser	Max. 1,000W	Max. 2,000W	Max. 3,000W
DMT® Motion XYZ Linear Gantry + AC Rotary stage X / Y / Z Stroke A / C Stroke	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

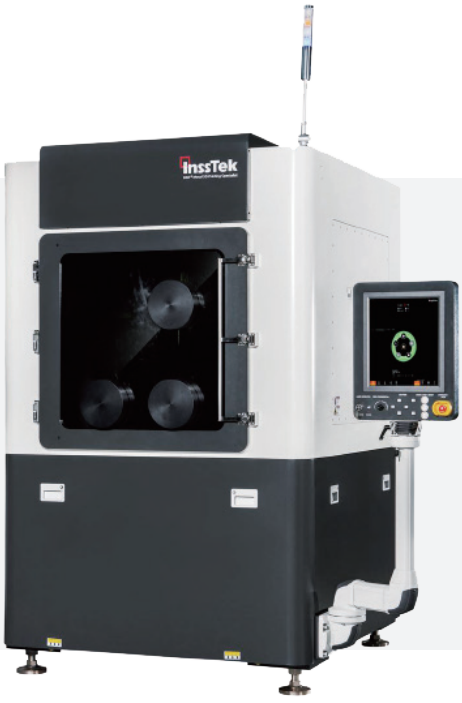
Printing metal parts by DMT® has superior mechanical properties, high density and fine microstructures.

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

MPC

Porous Coating Machine



Features

Titanium Porous Structure Application

MPC (Machine for Porous Coating) is developed to apply for orthopedic implant surface coating

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

MX-Lab

DED & Material research machine

Features

Simple system for easy entrance of DED

3-Axis system & DMT Technology

Focus on Material research

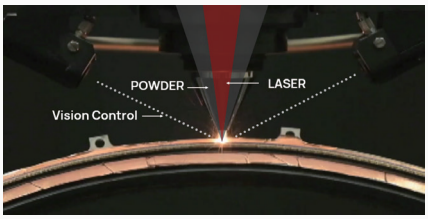
More accurate powder feeding system (CVM)

2nd Generation AM Module technology applied

DMT® Technology

The most precise DED technology

DMT® is Direct Metal Tooling that it is developed by INSSTEK's own technical skills and it is classified as directed energy deposition technology by ASTM standard. Using 2 vision Cameras, machine analyze and control the height of meltpool in realtime



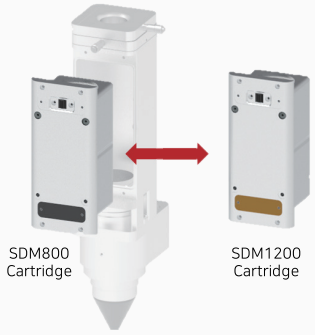
Applicable Materials for DMT

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

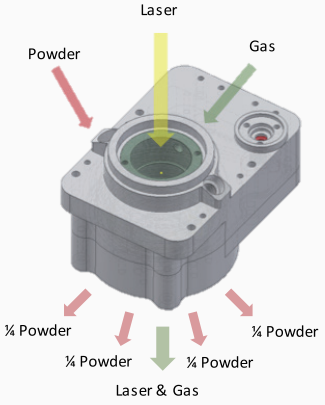
Type	SDM800	SDM1200
Beam Size	800um	1200um
Build Speed	4.3 cm^3/h	12 cm^3/h
Beam Profile		



Active Splitter

Co-axial type powder splitter with power

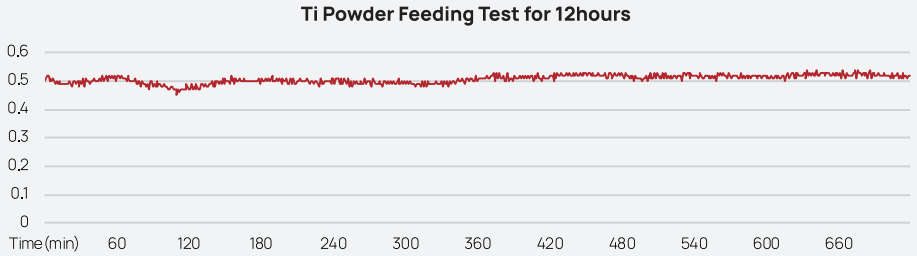
- Co-axial type Powder Splitter
- Even small amount of powder can be divided evenly
- Easy to use (No Calibration, No Mechanical Adjustment)



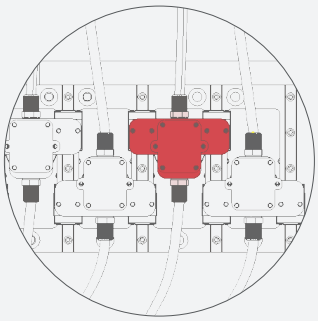
CVM Powder System

Next step of powder feeding system

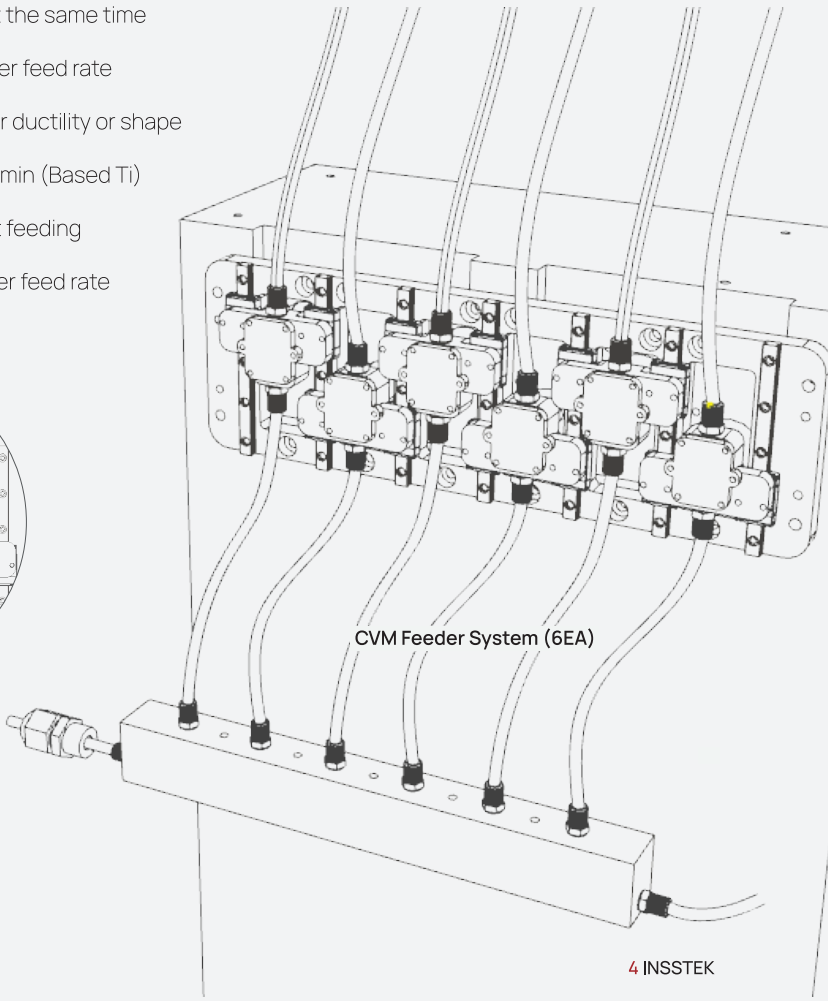
CVM (clogged vibration method) powder feeder is new type of powder feeding system. It has impressively stable powder feed rate, semi-permanent life time and broad feeding rate range. It can feed the titanium powder from 0.1g/min to 10g/min with no hardware change. Also this system applicable with gravity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



- CVM(Clogged Vibration Method) type powder feeder
- Feeding multi materials at the same time
- Gradually adjusting powder feed rate
- No effect by metal powder ductility or shape
- Feed rate range 0.1 - 10 g/min (Based Ti)
- Applicable Gravity / Direct feeding
- Impressively stable powder feed rate



CVM Feeder Block

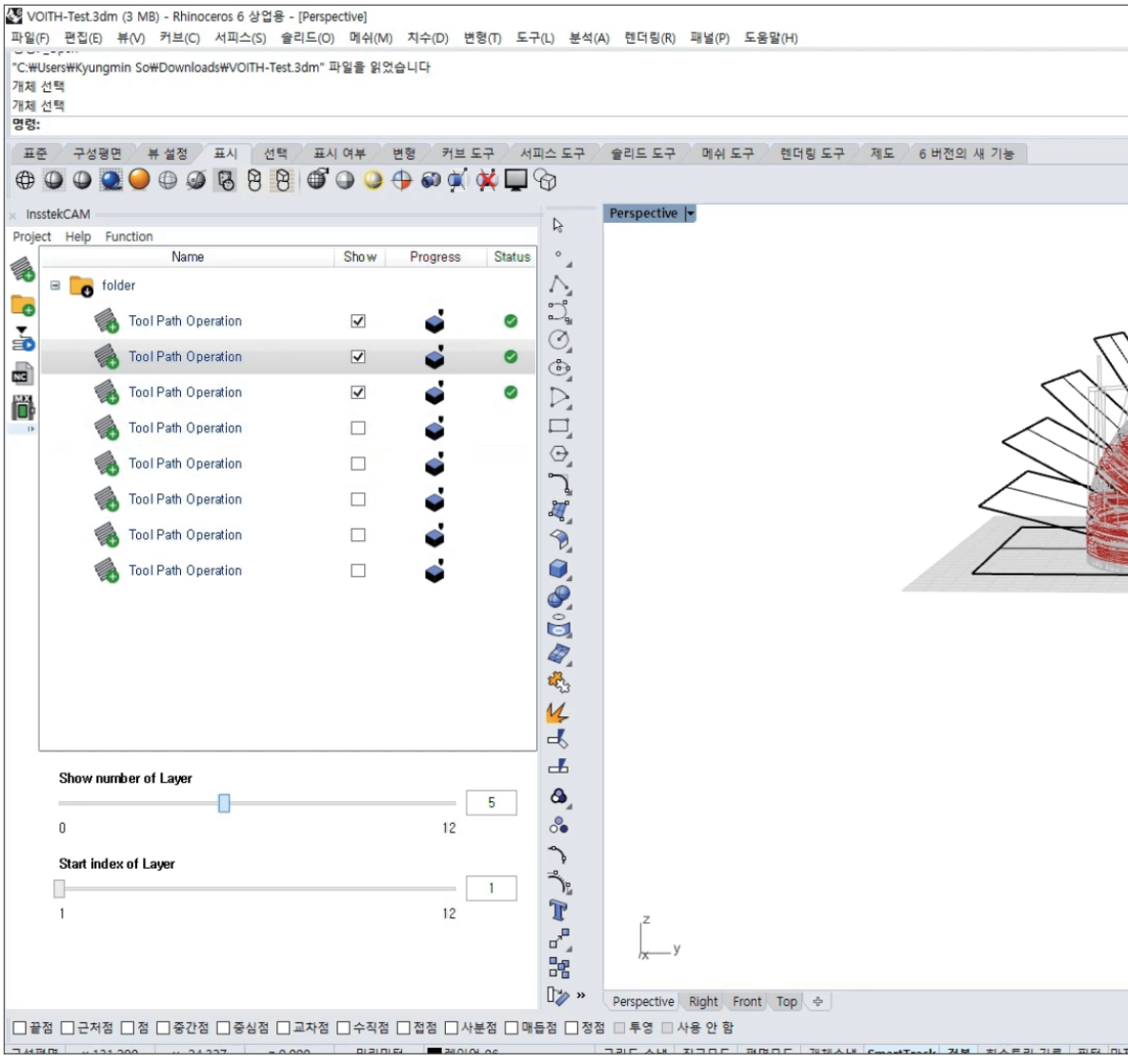


CVM Feeder System (6EA)

Simultaneous 5-Axis AM-CAM

Perfect Solution for Simultaneous 5-Axis AM-CAM

Simultaneous 5-Axis AM-CAM is one of the most important part of DED Additive Manufacturing. It make us overcome the limitations of DED technology. It enables the application of complex shapes that could not be manufactured by the existing DED technology. Combine of INSSTEK's years of know-how and new software technology make this possible. Let's try to break the limitation of DED with INSSTEK.

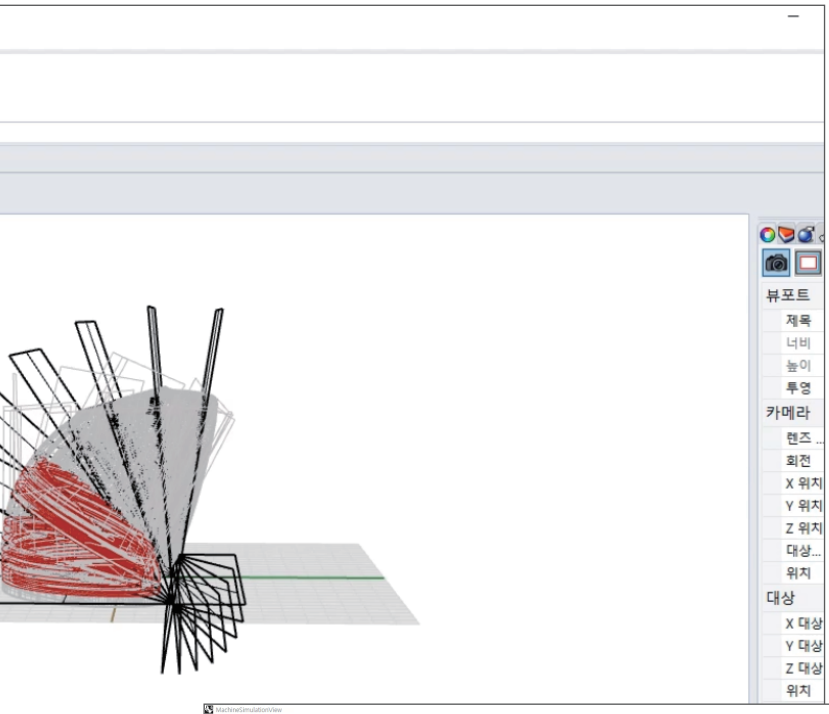


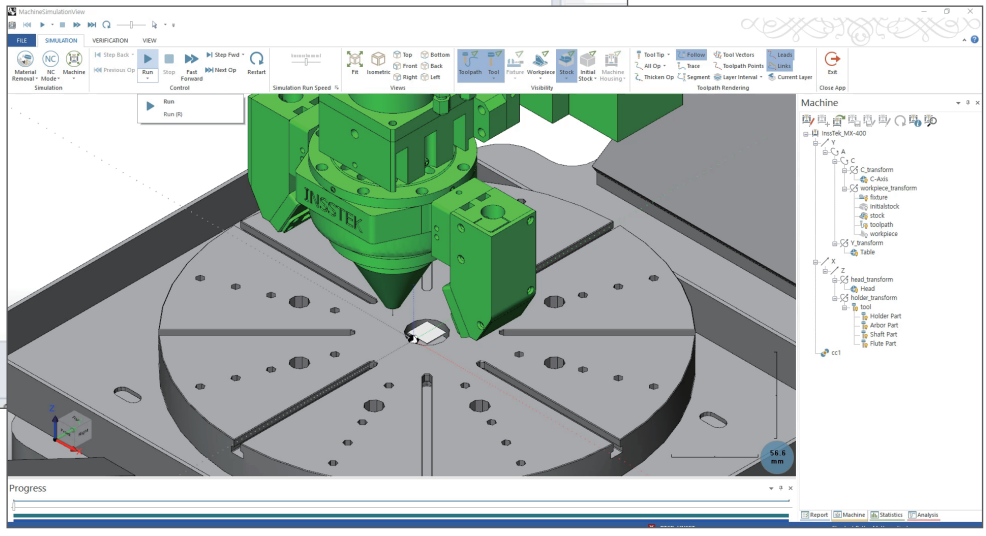
5-Axis AM ToolPath Generation

Path-by-Path Calculation

Start Point Mixing

Automatic Pipe Slicing





5-Axis AM Simulator

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5-Axis Sample

Simultaneous 5-Axis CAM made

Research for gas pipe with simultaneous 5-Axis motion. The cross section starts from circle and gradually changes to a rectangle.

Material : SUS316

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Jet Engine Air Seal

Repairing for Korean Air Force

It was required to restore damaged part of turbine engine. It originally took min. 3 months to replace worn out parts.

Material : Ti-6Al-4V

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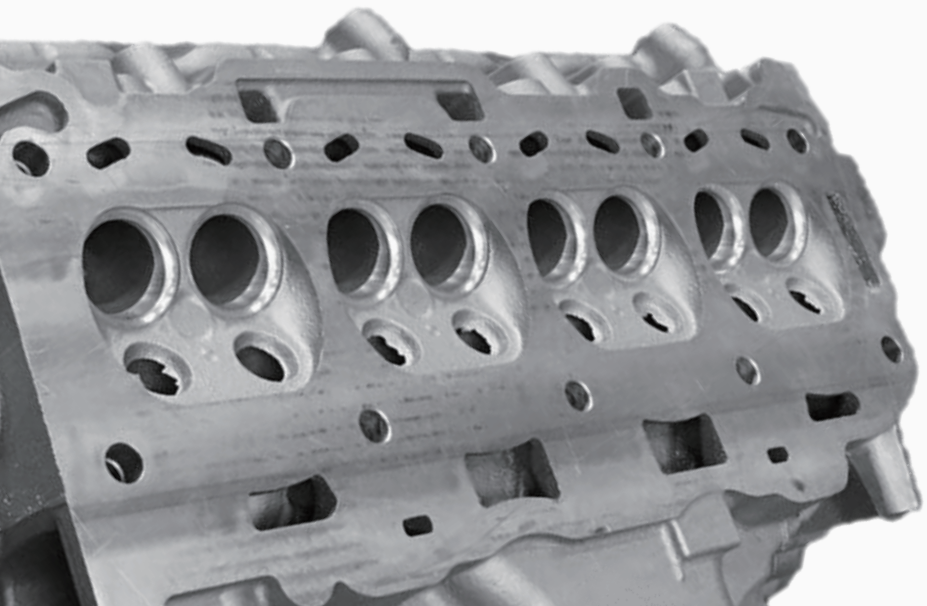
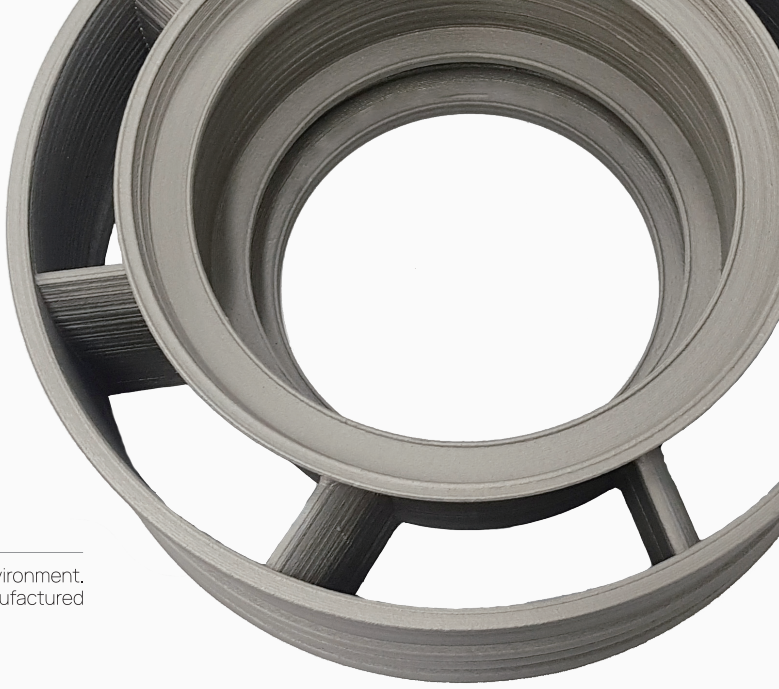
Automobile Engine

Cladding on valve seat for fuel-efficiency

For Increasing fuel-efficiency 2%, there is needed cladding on valve seat of intake port side of engine with INSSTEK's AM Technology

Material : Classified





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Gas Turbine Blade

Simultaneous 5-Axis CAM made

Mechanical part for high temperature environment. It made with titanium material and manufactured with 5-Axis DED technique.

Material : Ti-6Al-4V

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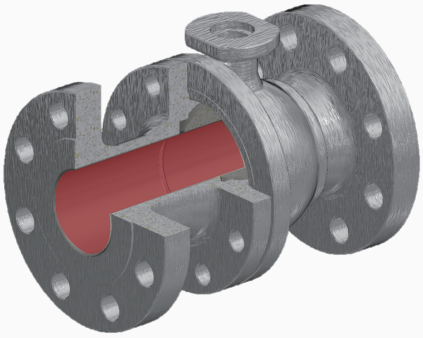
Multi Material Valve

Bi-material technology for anti-corrosion

Research for making new type over-lay valve using multi material. Manufactured with Inconel material using simultaneous 5-Axis motion

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



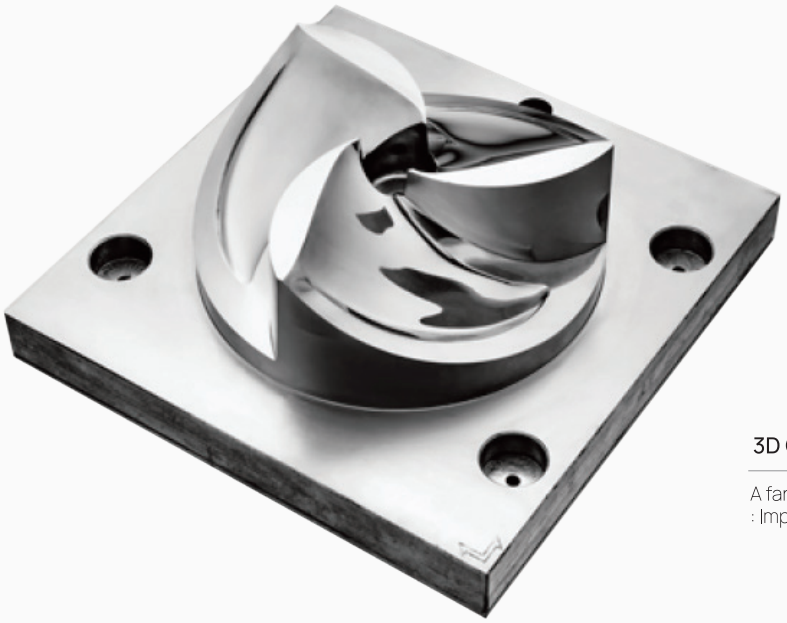
MPC

Artificial Joint

Porous Coating Process

A global leading artificial knee and hip joint manufacturer wanted to optimize operational efficiency including delivery and cost management for their hip joint coating.

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



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Home Appliance

3D Cooling Channels Application

A fan mold made by 3D cooling channels : Improvements in cooling efficiency and noise reduction

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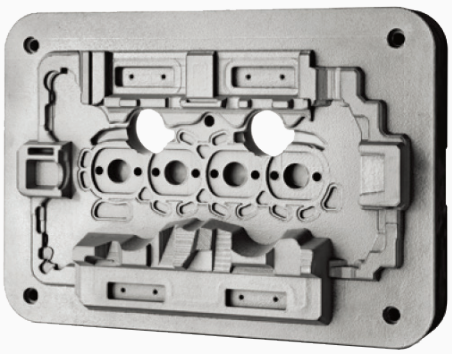
Automotive Mold

Reconfiguration of Plastic Injection Mold

DED has avility to reconfiguration of Plastic Injection Mold. This reconfiguration can reduce the lead time and redesign cost

Material : Classified



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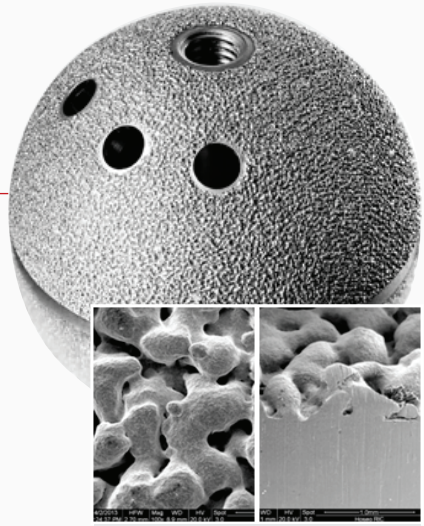
Automotive Mold

Corossion-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



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 as needed

SEM of Porous Coating by MPC :
MPC provides excellent mechanical properties and porosity fulfilling industrial production requirements.

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 step 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 the 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

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