
Meet the new generation of Additive Manufacturing
**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

**Technical Data**

<table>
<thead>
<tr>
<th></th>
<th>MX-600</th>
<th>MX-1000</th>
<th>MX-Grande [custom]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser type</td>
<td>Fiber Laser</td>
<td>Max. 1,000W</td>
<td>Max. 2,000W</td>
</tr>
<tr>
<td>DMT Motion</td>
<td>XYZ Linear Gantry + AC Rotary stage</td>
<td>450 x 600 x 380</td>
<td>800 x 1000 x 680</td>
</tr>
<tr>
<td></td>
<td>X/Y/Z Stroke</td>
<td>-100 – +5° / 360°</td>
<td>-100 – +5° / 360°</td>
</tr>
<tr>
<td></td>
<td>A/C Stroke</td>
<td>4000 x 1000 x 1000</td>
<td>-100 – +5° / 360°</td>
</tr>
<tr>
<td>Control System</td>
<td>PC-based Control System with Touch Screen</td>
<td>DMT™ Closed Loop Feedback Control system</td>
<td></td>
</tr>
</tbody>
</table>

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

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**MPC**
Porous Coating Machine

**Features**
- Titanium porous structure application
- MPC (Machine for Porous Coating) was originally developed for application in orthopedic implant surface coating.
- The system is currently being used for artificial knee & hip joint coating.

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**MX-Lab**
DED & Material research machine

**Features**
- Simple system for easy entrance of DED
- 5-Axis system & DMT Technology
- Focus on material research
- More accurate powder feeding system (CVM)
- 2nd generation AM module technology applied

### DMT
**Materials**
- **UTS (MPa)**
- **YS (MPa)**
- **Elongation %**
- **Hardness [HRc]**

<table>
<thead>
<tr>
<th>Materials</th>
<th>UTS (MPa)</th>
<th>YS (MPa)</th>
<th>Elongation</th>
<th>Hardness [HRc]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMT™</td>
<td>Vertical</td>
<td>1327</td>
<td>1420</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Horizontal</td>
<td>1398</td>
<td>1477</td>
<td>5%</td>
</tr>
<tr>
<td>Forging</td>
<td>1321</td>
<td>1385</td>
<td>9%</td>
<td>S1</td>
</tr>
</tbody>
</table>

*The data represents the condition with no heat treatment*
**DMT® Technology**

The most precise DED technology

DMT®, Direct Metal Tapping, 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 molten pool in real-time.

<table>
<thead>
<tr>
<th>Applicable Materials for DMT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium</td>
<td>CP-Ti6Al4V, Ti6Al4V</td>
</tr>
<tr>
<td>Steel</td>
<td>P90, P21, P13</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>304, 316, 420</td>
</tr>
<tr>
<td>Nickel</td>
<td>600, 625, 690, 713, 718</td>
</tr>
<tr>
<td>Hastelloy</td>
<td>22, 276</td>
</tr>
<tr>
<td>Copper</td>
<td>Co-65, AlBronze</td>
</tr>
<tr>
<td>Cobalt</td>
<td>CoCr. Stellite 20, 25</td>
</tr>
</tbody>
</table>

**Multi Optic**

Cartridge type optic system

<table>
<thead>
<tr>
<th>Type</th>
<th>SDM800</th>
<th>SDM1200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beam Size</td>
<td>800μm</td>
<td>1200μm</td>
</tr>
<tr>
<td>Build Speed</td>
<td>4.3 cm/h</td>
<td>12 cm/h</td>
</tr>
<tr>
<td>Beam Profile</td>
<td><img src="image" alt="Beam Profile" /></td>
<td><img src="image" alt="Beam Profile" /></td>
</tr>
</tbody>
</table>

**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 lasser, and a broad feeding rate range. It can feed titanium powder from 0.5g/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 Powder Feeding Test for 12 hours**

- **CVM (Clogged Vibration Method) type powder feeder**
- Feeds multi materials at the same time
- Gradually adjustable powder feed rate
- Not affected by metal powder ductility or shape
- Feed rate range 0.5 - 10 g/min (based on Ti)
- Gravity / direct feeding available
- Impressively stable powder feed rate
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 INSTTEK’s DED additive manufacturing. Combined with INSTTEK’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.
Multi Material Valve
Bi-material technology for anti-corrosion
Material: SUS 316 (Outer), Inconel 625 (Inner)

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. INSTEX reduced the cost and time dramatically.
Material: Ti-6Al-4V

Automobile Engine
Cladding on valve seat for fuel-efficiency
INSTEX’s 5-Axis technology increased fuel efficiency up to 2% in an automobile engine by cladding the valve seat of the intake port side of the engine.
Material: Classified

Turbine Vane Ring
Made with Simultaneous 5-Axis CAM
Material: Ti-6Al-4V

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. INSTEX reduced the cost and time dramatically.
Material: Ti-6Al-4V

Multi Material Valve
Bi-material technology for anti-corrosion
Research was conducted to make a new type of valve using multi material. An inconel valve was manufactured using Simultaneous 5-Axis motion.
Material: SUS 316 (Outer), Inconel 625 (Inner)

Automobile Engine
Cladding on valve seat for fuel-efficiency
INSTEX’s 5-Axis technology increased fuel efficiency up to 2% in an automobile engine by cladding the valve seat of the intake port side of the engine.
Material: Classified

Artificial Joint
Porous coating process
In cooperation with a global leading artificial knee and hip joint manufacturer, INSTEX 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)
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: 100-400μm) that strengthens interfacial bonding between coating layer and substrate as well as biological fixation with bone.

**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 Tilt by.

**COMPLEX PARTS PRODUCTION**
Porous coating possible using a simultaneous 5-axis motion.

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**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 3D technology.

Material: Classified

**MX-Standard Automotive Mold**
Corrosion-resistant material

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

Coating Material: Hastelloy C-22

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**SEM of Porous Coating by MPC**
MPC provides excellent mechanical properties and porosity suitable for industrial production requirements.

**Medical Application**
Porous coating of artificial hip joint and knee replacement.