



TiAlN

TiN

TiAlCN

TiCN

ZrN

CrN

AlCrN

AlTiN

Multilayer

Al₂O₃

TiO₂

Al_xO_y

ZrO₂

Nanocomposite

Monolayer

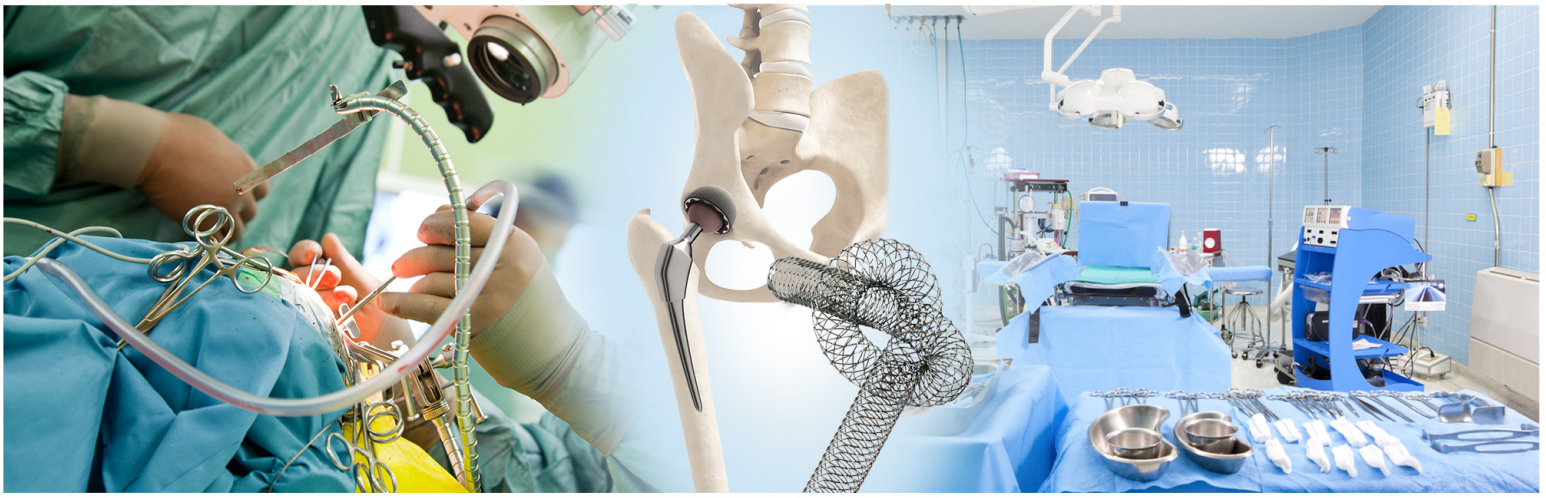
Superlattice

Nanolayer

DLC

MEDICAL SERIES

Multi Source
Biocompatible
Coating Solutions



MEDICAL SERIES PLATFORM

This highly configurable product group enables a wide range of tribological process methods and simplicity for upgrade or retrofit for future applications. The base system incorporates all of the industrial design features that have made Mustang Medical successful with many applications in the medical device industry.

- Recipe driven industrial control platform with touch screen industrial PC interface.
- Proven industrial system design for ergonomic maintenance and high uptime
- High uptime solution utilizing tier 1 component suppliers with global support
- Single or dual door design with integrated tooling to maximize production capacity

CHAMBER OPTIONS

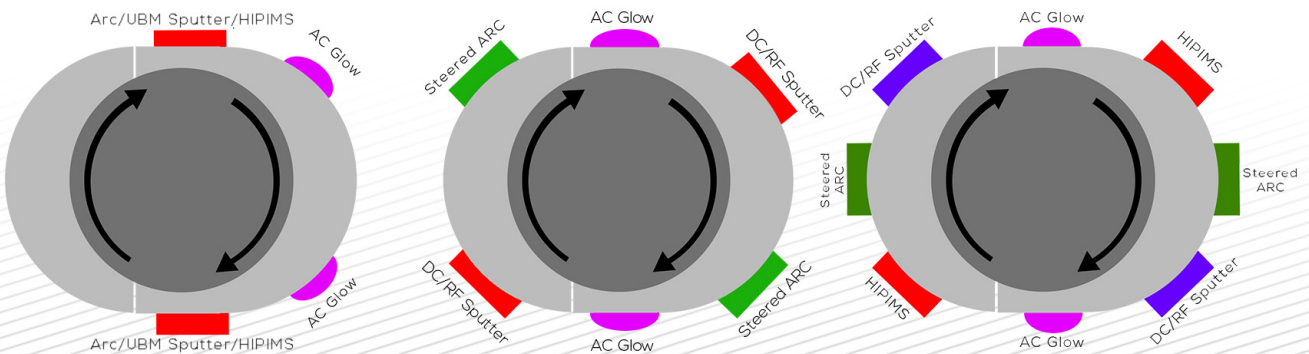
Mustang Medical's highly configurable solutions start with a chamber selection based on the number of sources. Up to 8 deposition positions can be configured with a range of deposition sources and power options.

Mustang's systems can be arranged to comprise either dedicated single deposition techniques or alternatively by combining deposition methodologies hybrid solutions with up to 8 different deposition methodologies.

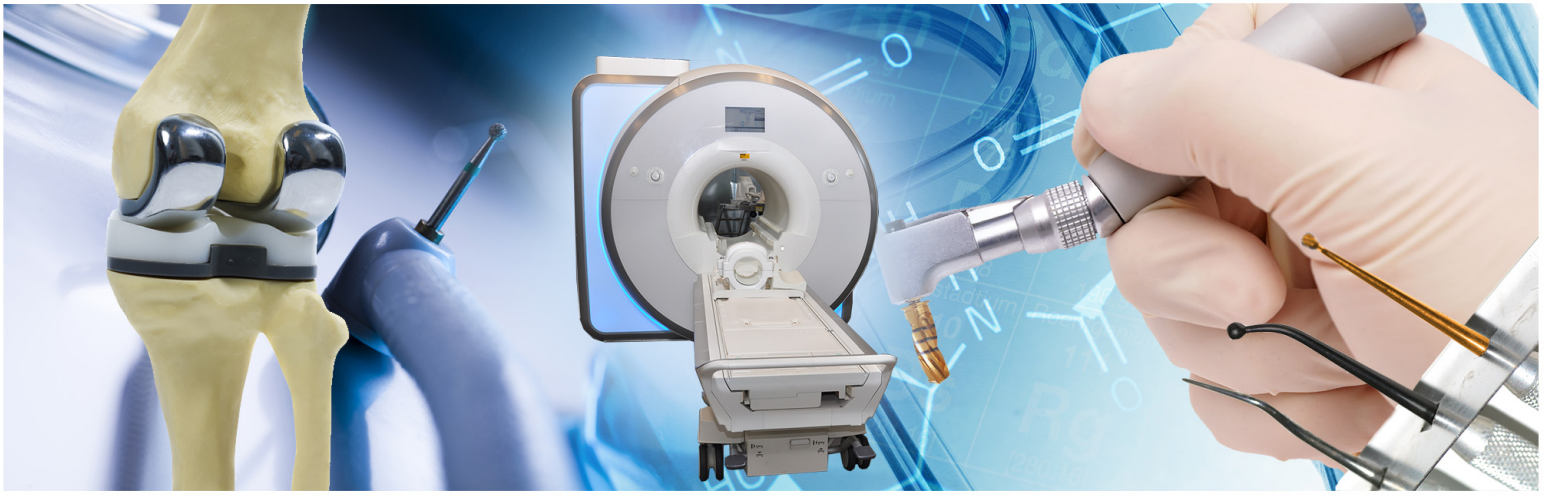
Standard coating area of 24inch or 48inch height by 24-38inch diameter with single rotation or multiple planetary rotation.

Systems are available from small batch, for individual implants, to large scale, for full production environments. Some examples of Mustang Medical system configurations are shown below.

4 Source	6 Source	8 Source
Single Process	Dual Process	Advanced Hybrid



- Further customized machine sizes and configurations are also available on request. -



MUSTANG MEDICAL CATHODES

Mustang's patented high power planar cathodes have the highest, large format, power densities in the industry. They are available for biocompatible coating applications and solutions.

- 200 Watt inch² or 30 Watt cm² maximum allow for the most demanding high energy/high rate process.
- Sealed water body design and complete customer serviceability increases uptime and reliability.
- Patented high temperature clamping system eliminates target warping.
- Designed for high uptime, the cathodes are easily removed and configured with quick release water and power connection and integrated material handling for single person maintenance.



SOURCE CONFIGURATIONS

Mustang Medical offers integration of sources from a number of leading suppliers in addition to offering its own deposition sources. Sources are configured with a wide range of power options with a highly robust and repeatable recipe based interface.

Sputtering - Planar and rotating configuration.

- High rate unbalanced magnetron sputtering (DC, Pulsed, AC, RF)
- High rate conventional / balanced sputtering (DC, Pulsed, AC, RF)
- HIPIMS

PACVD/PECVD - Plasma assisted/enhanced chemical vapor deposition

- Hot filament excitation, RF & mid-Frequency [40kHz, 250kHz] bias
- DC / AC linear glow discharge

Evaporation

- Steered cathodic arc (rectangular & circular cathode arrangements)
- Random cathodic arc
- Thermal
- Electron beam

Hybrid Systems - Combine two or more deposition methodologies in a single chamber with advanced recipe control so materials can be deposited sequentially or simultaneously.

- PVD + PACVD
- UBM + Arc/HIPIMS

Controlled by our proven recipe driven interface, Mustang offers the widest flexibility for power sources and deposition methodologies. Mustang's Industrial Power Switching Network allows for multiple power sources to be software selected with no physical hardware changes allowing customers to switch from AC, DC, RF or HIPIMS rapidly and safely with a push of a button.



SERVICE & SUPPORT

Mustang Medical Systems and our global service partners provide onsite installation, repair service, preventative maintenance, applications and service training. Mustang Medical systems come standard with a dedicated VPN or analog telephone connection, allowing Mustang's service and support team to remotely diagnose and resolve any problems. We are available to provide support for your system 24/7.

MEDICAL DEVICE APPLICATIONS

Diagnostic Imaging
 Medical Diagnostics
 Biomaterials
 Vision & Eyewear
 Orthopedic Implants and Devices
 Drug Delivery Systems

Surgical Instruments & Devices
 MEMS
 Dental Implants & Instruments
 Pharmaceuticals

*Mustang Medical is also fluid in nano technology and nano crystal growth.

BIOCOMPATIBLE DEPOSITION LAYERS

	Color	Hardness (HV)	Thickness (µm)	Max Temp (°C)	Friction Coefficient vs 100Cr6)	Most Common Equipment Configuration
TiN	Gold	2400-3000	1-4	500	0.5	2-4-6 Cathode Steered Arc or UBM Sputter
TiCN	Blue/Grey	2400-3200	1-3	400	0.3	
ZrN	Champagne	2000-2700	1-4	500	0.5	
ZrCN	Various	2000-3000	1-3	400	0.35	
CrN	Silver	1700-2800	1-5	700	0.5	
TiAlN	Dark Grey/Purple	2300-3000	1-4	800	0.55	
TiAlCN	Grey/Black	2500-3200	1-3	700	0.4	
AlTiN	Blue/Black	2400-3100	1-4	850	0.55	
AlCrN	Grey	2600-3200	1-4	950	0.5	
Ti-DLC	Grey-Black	700-1500	1-5	250	0.15	
Cr+WC/C	Grey-Black	800-1800	1-4	250	0.15	
Graphite/Low H	Grey	500-2000	1-3	250	0.1	Dual Cathode UBM Sputter with Hot Filament
CVD a-C:H	Grey-Black	1000-3000	1-3	280	0.05	
CVD Doped a-C:H	Grey-Black	1000-3000	1-3	280-350	0.05	
Metal Oxides						
Boron Containing						

*FDA compliant cytotoxicity reports available upon request