

2026

Huasheng MD series Arc Coating Equipment

To be the top surface solution supplier in the world



CONTENTS

「01」

MD Series Equipment Introduction

「02」

MD Series Equipment Characteristics

「03」

MD Series Equipment Parameters

「04」

MD Series Equipment Application

01

MD Series Equipment Introduction

MD equipment adopts Huasheng's new lateral etching technology and multi -arc ionplating to achieve high ionization rate arc plasma coating technology. The films prepared by it have wide versatility and have a greatly improved service life in steel milling, stainless steel turning, etc. Improvement, high reliability of equipment and stability of process make coating production simpler and more efficient.

Technology

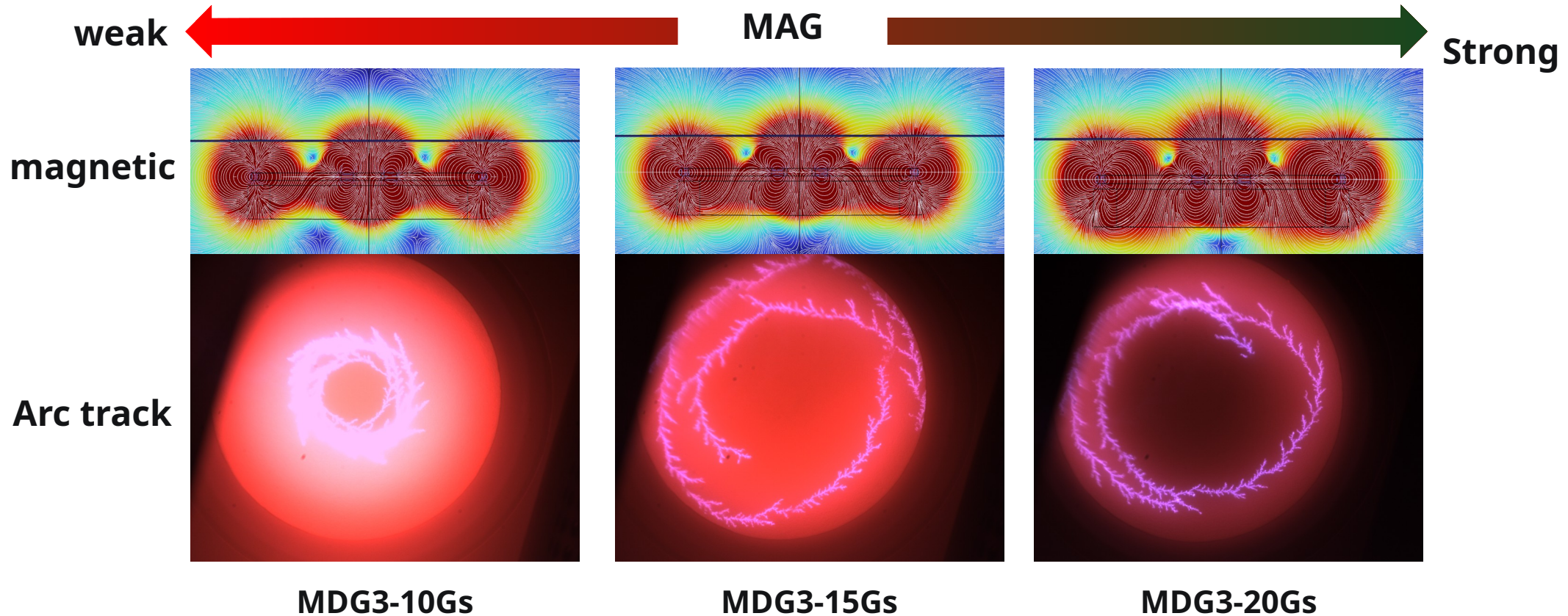


02

MD Series Equipment Characteristics

MD Series Equipment Arc Source Characteristics

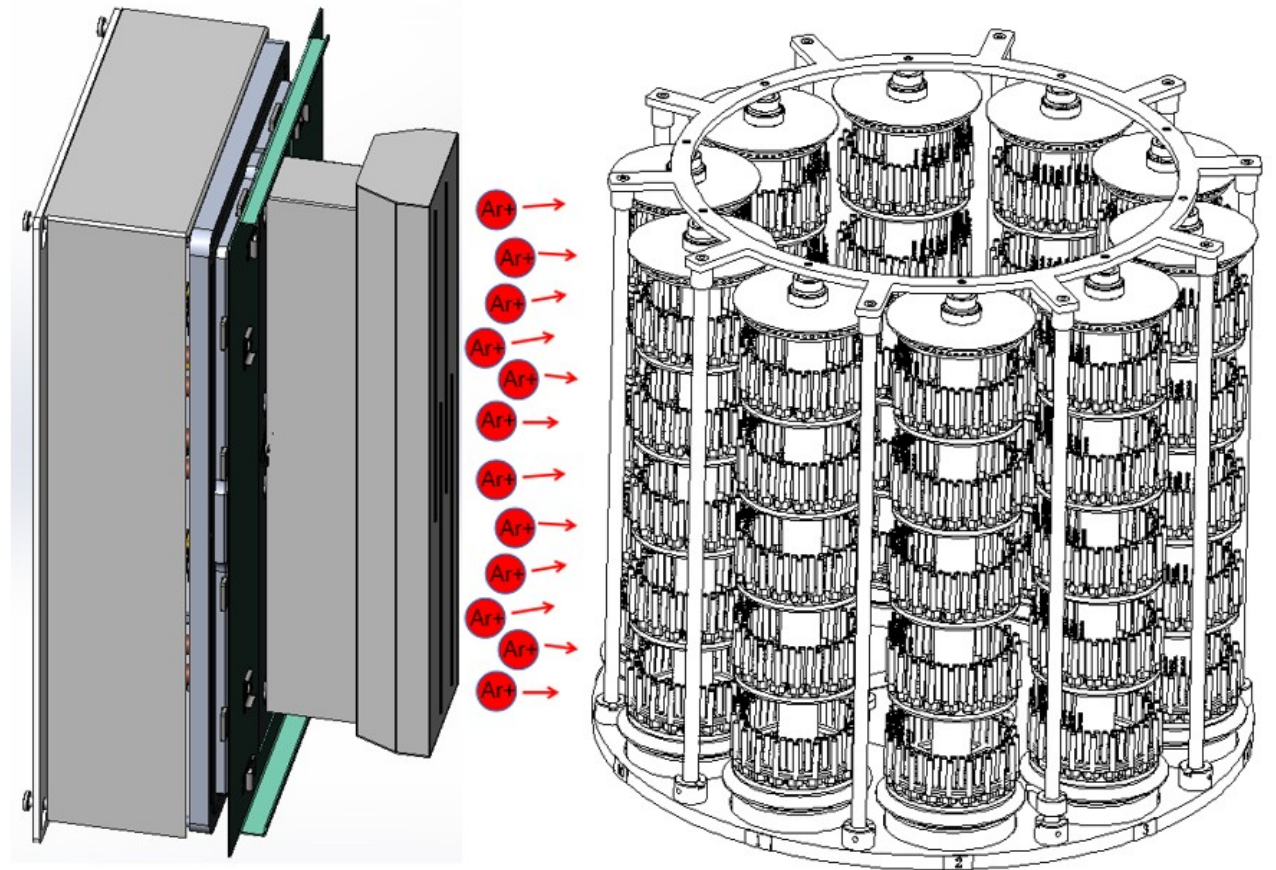
- Adjustable magnetron field 、 less droplets 、 high deposition rate and ionization rate
- Concealed trigger, easy to maintenance



Equipment Characteristics

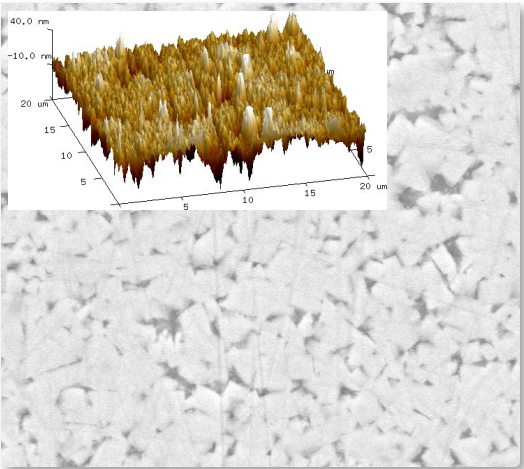
- **Uniformity**
- **Diffractionivity**
- **Adjustable etching strength**
- **No maintenance**

WET

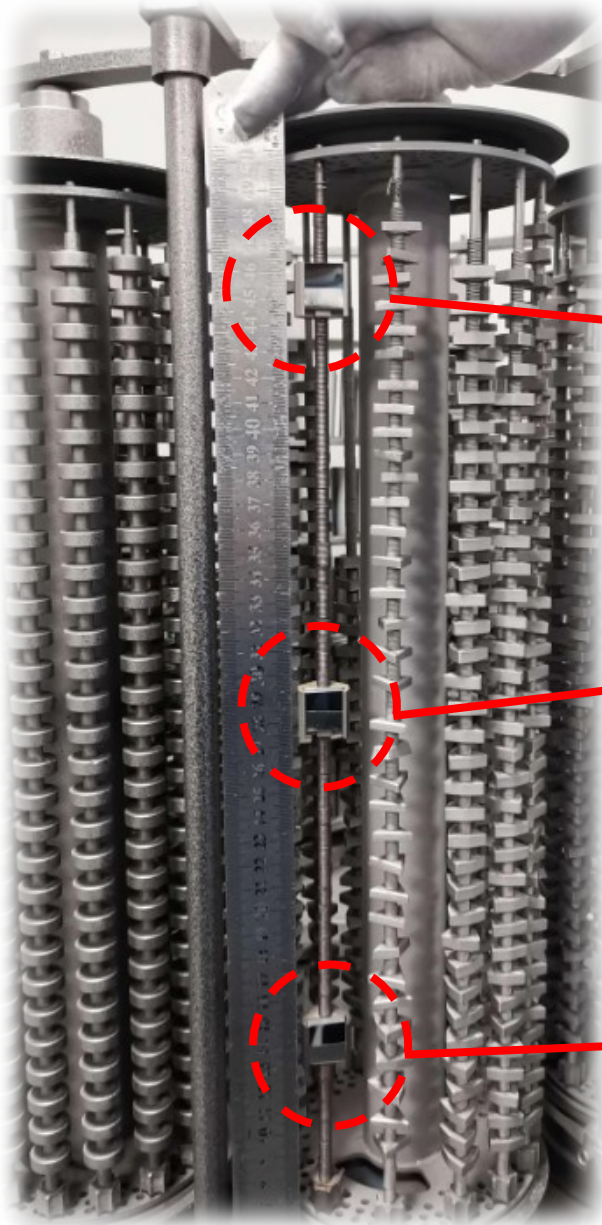
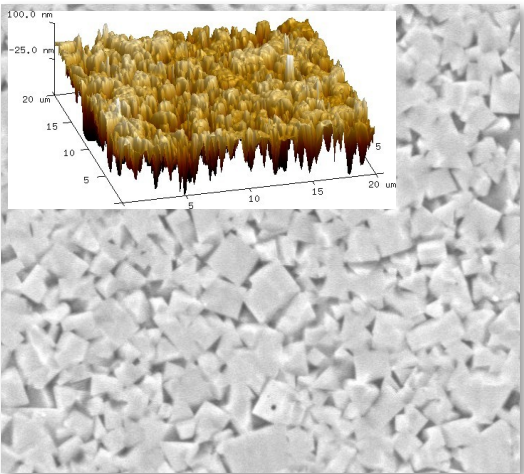


MD Series Equipment Characteristics

Before etching



After etching



Position	Etching stength	Roughness (nm)	
	Depth(nm)	Before	After
Up	486	8.1	14.5
Middle	432	8.8	15.4
Down	428	9.8	16

MD Series Equipment Characteristics

High deposition rate



The current density of the arc spot is as high as 1012A/m², and the energy density is as high as 1013W/m². The high energy density directly leads to the transformation of the target material at the arc spot from solid phase to metal vapor plasma.

Efficient and convenient operation, high batch production capacity



Fully automatic coating system, efficient and reliable, capable of batch production 4-5 times a day, equipped with historical records, storable process recipes, offline editing, abnormal alarm, and touch screen operation.

High ionization rate



Arc discharge is generated between the cathode evaporation source and the shell, and glow discharge is generated between the workpiece base and the shell, causing the cathode target to evaporate and ionize, generally up to 60-80%.

High impact resistance



The film has moderate hardness, film adhesion, high rigidity, and good impact resistance, suitable for rough machining.

03

MD Series Equipment Parameter

MD Series Equipment Parameter

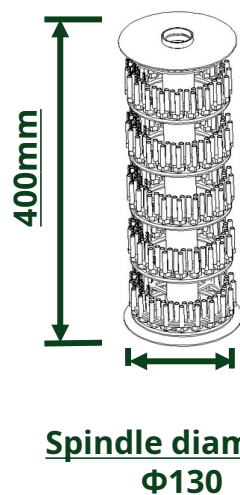
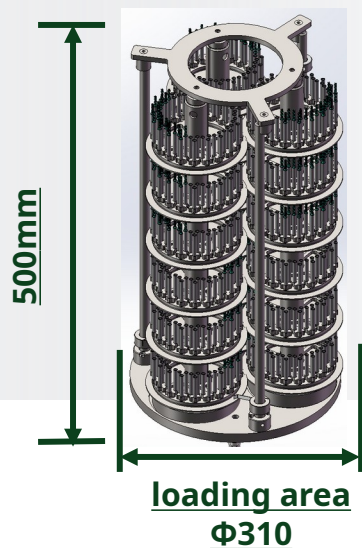
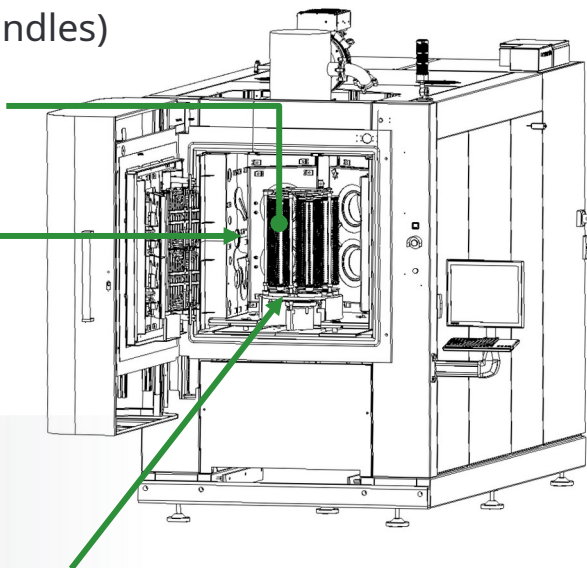


Model	MD200	MD500	MD800 Plus
Coating technology	Arc Ion Plating		
Etching	WET Lateral Hot Filament Etching		
Arc sources	4	6	8
Equipment size(mm)	Length*Width*Height: 3000*1400*2400	Length*Width*Height: 3400*1600*2600	Length*Width*Height: 3750*1800*2500
Volume (m ³)	0.5	0.7	1
Effective coating area (mm)	Φ310*400	Φ410*400	Φ650*400
Maximum working temperature (°C)	500	600	600
Power (kW)	50	80	85
Capacity (number of trees)	3	5	10
Insert load (APMT1135)	3600pcs	6000pcs	12000pcs
End mill load (D4*50L)	1000pcs	1800pcs	3600pcs
Hobbing tool load (D80*L150)	/	/	30PCS
Maximum loading weight (KG)	200	300	500
Spindle diameter (mm)	Φ130	Φ130	Φ130
Process time (h)	AlTiN:6~8	AlTiN:6~8	AlTiN:6~8

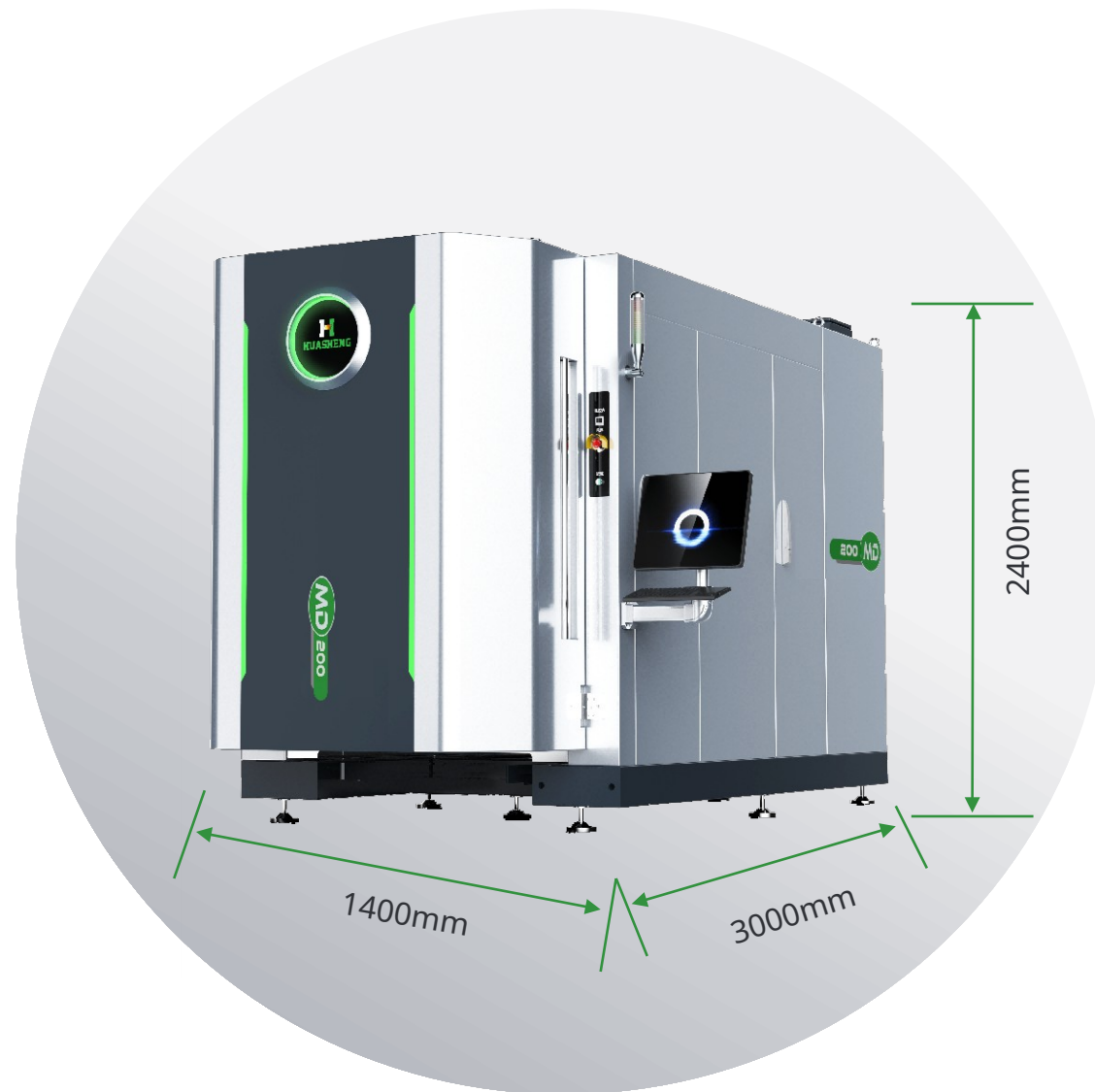
MD200 Equipment Parameter

Loading capacity (3 spindles)

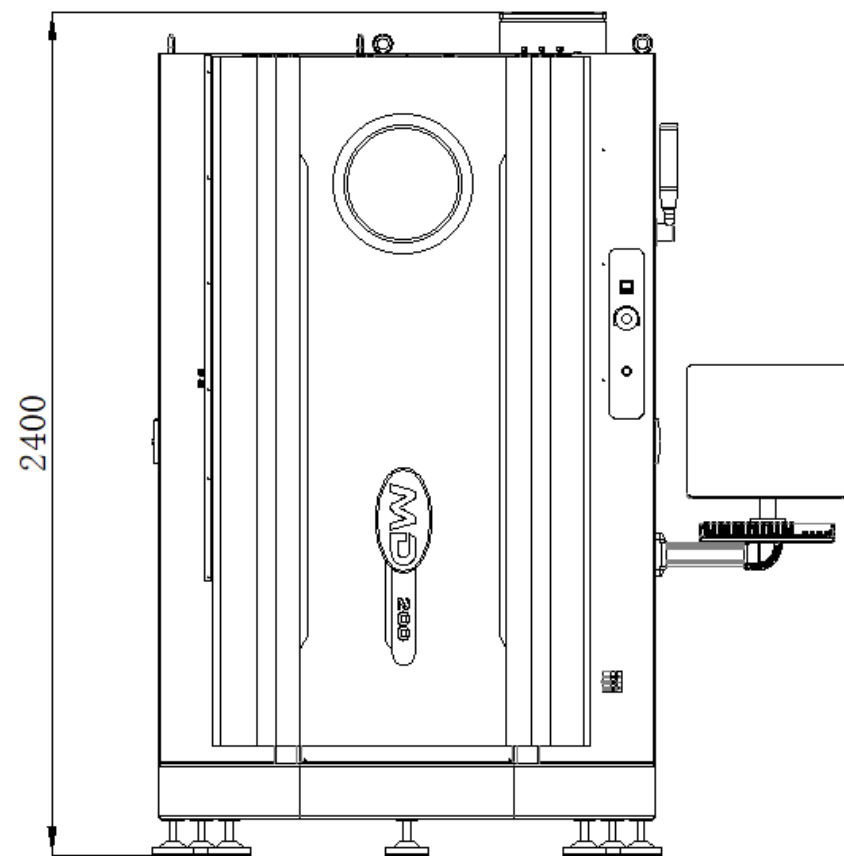
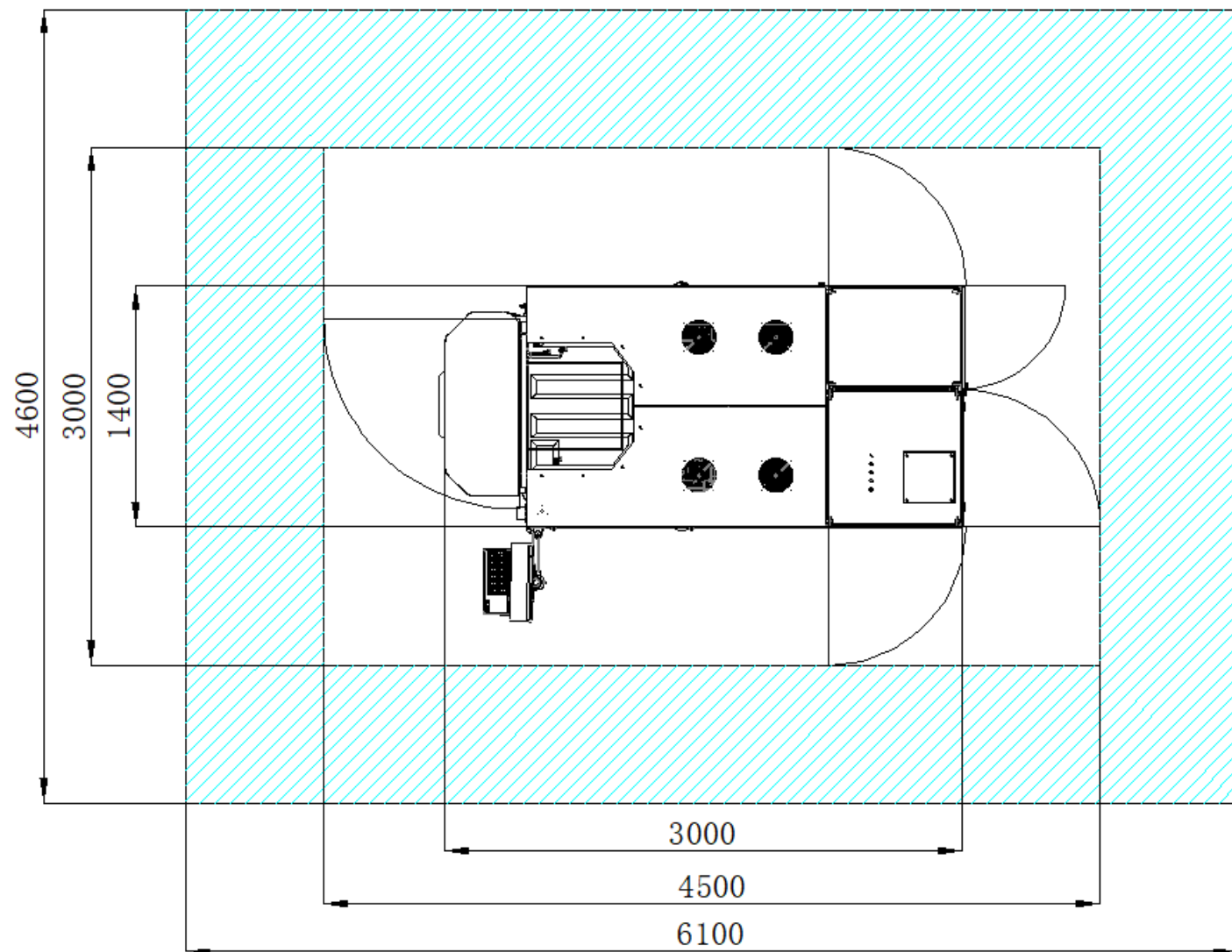
Volume(0.5m³)



Effective
coating area



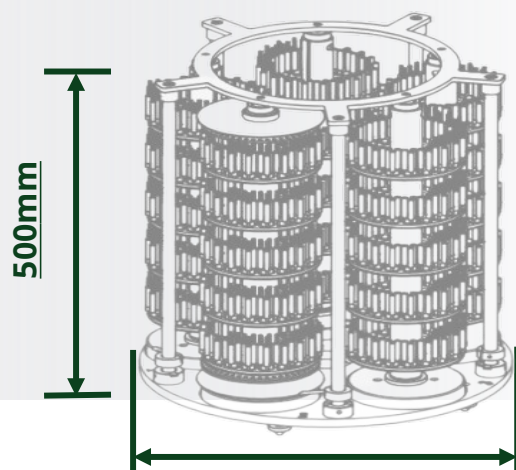
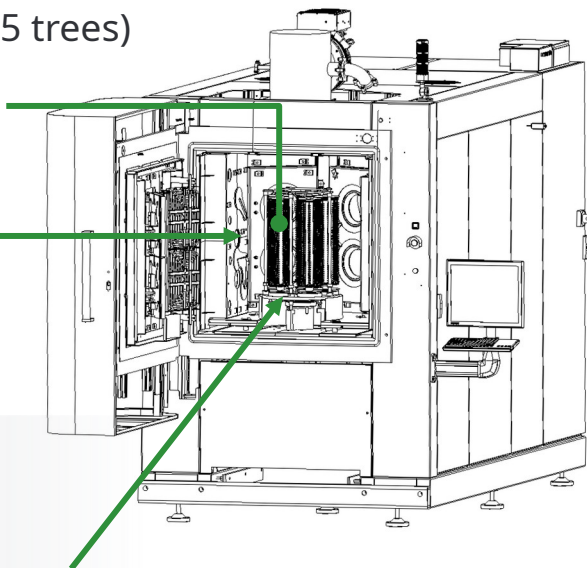
MD200 Layout



MD500 Equipment Parameter

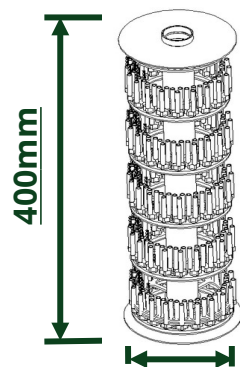
Loading capacity (5 trees)

Volume(0.7m³)



500mm

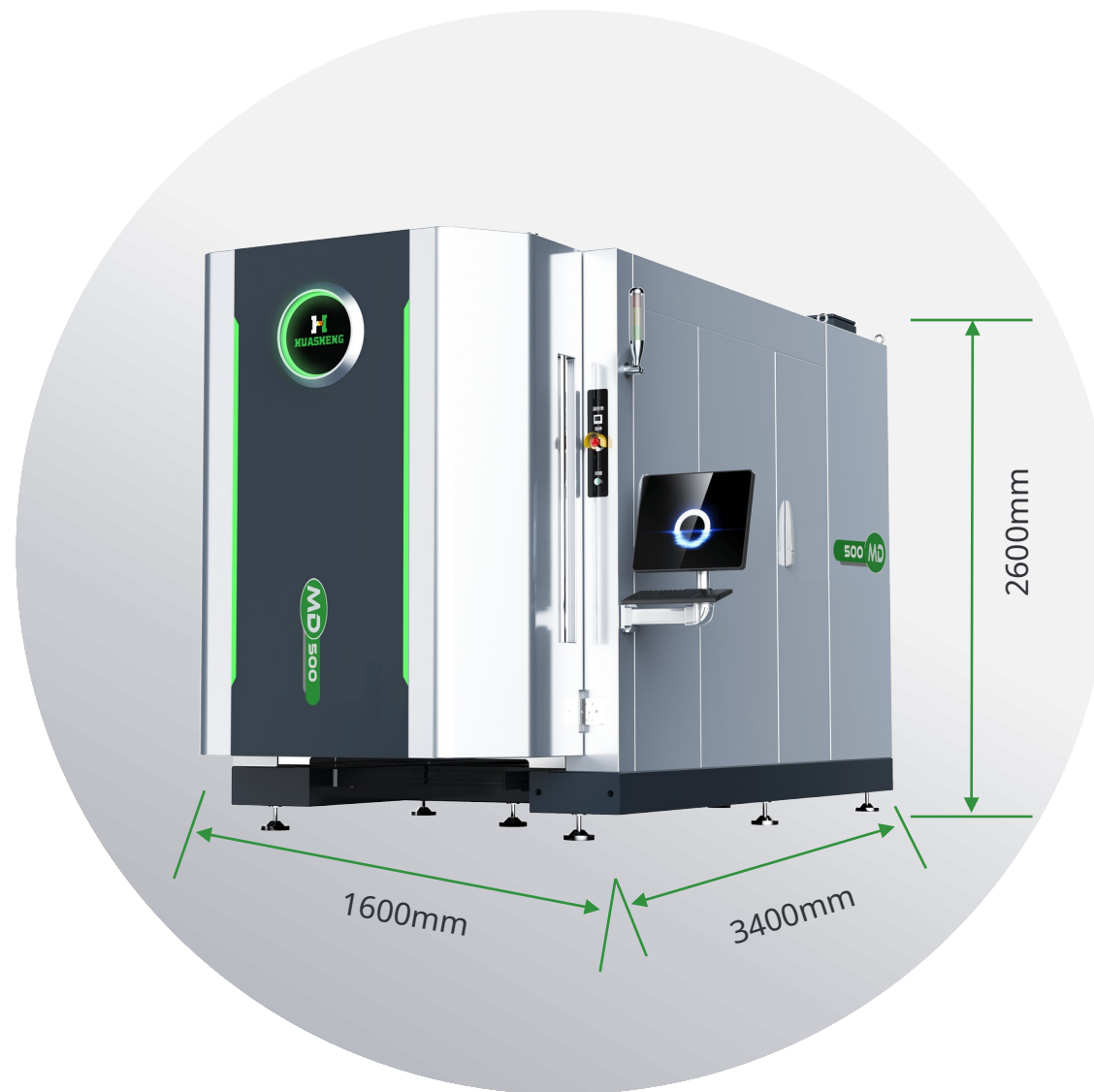
loading area
Φ410



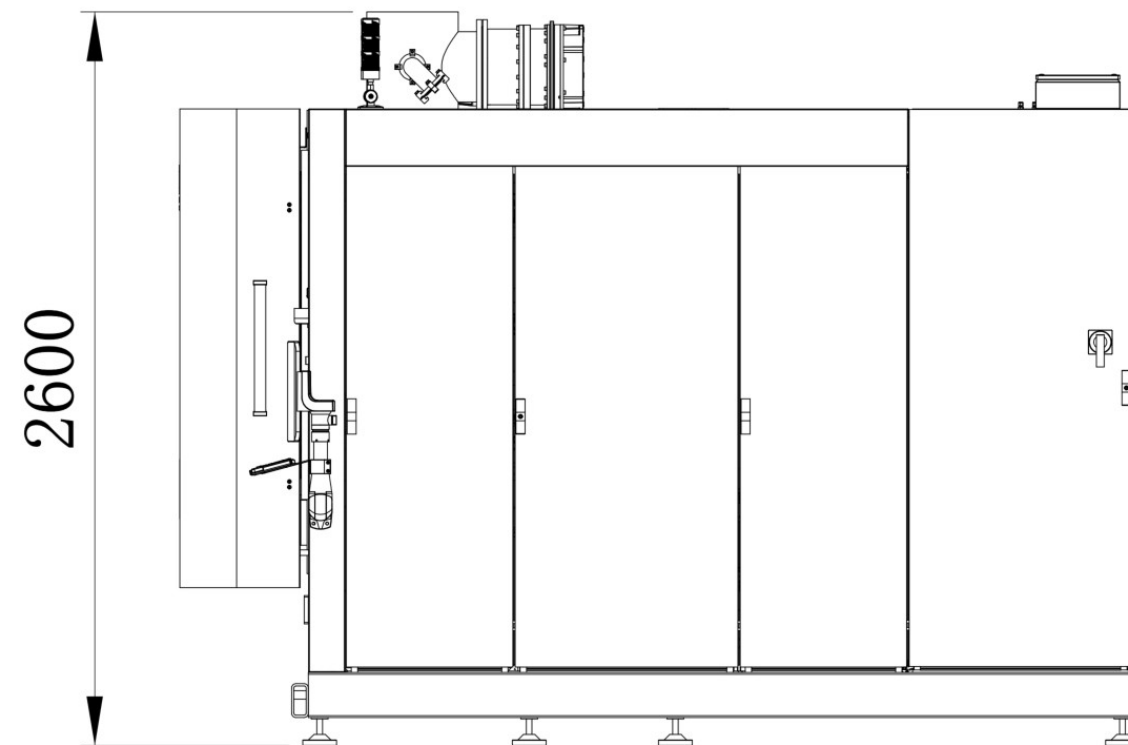
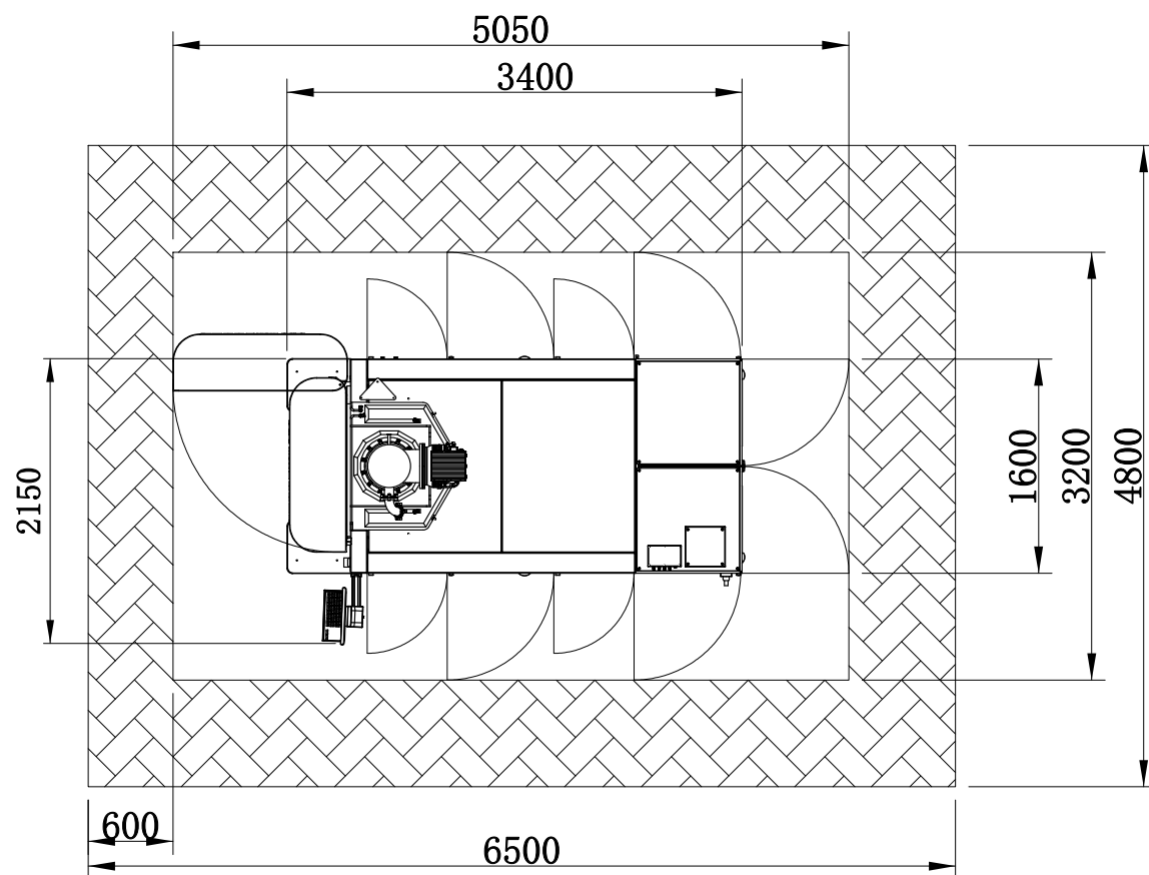
400mm

Spindle diameter
Φ130

Effective
coating area



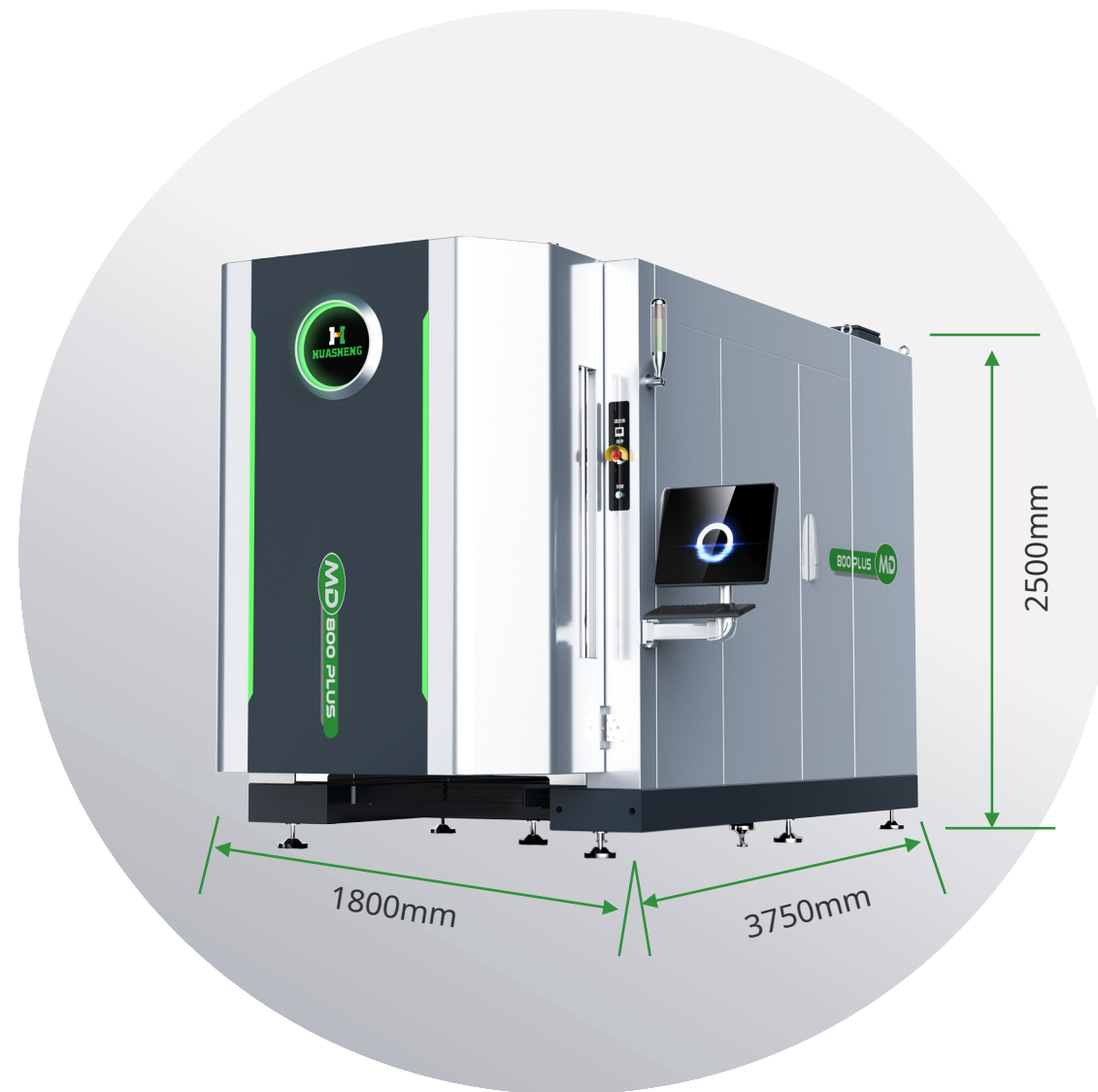
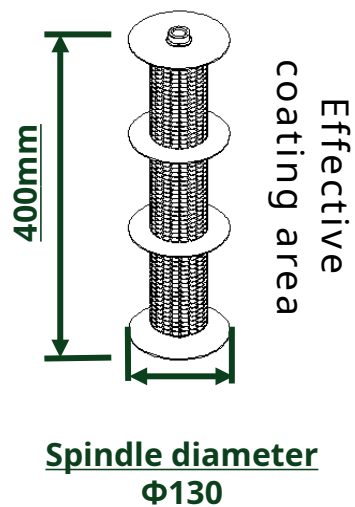
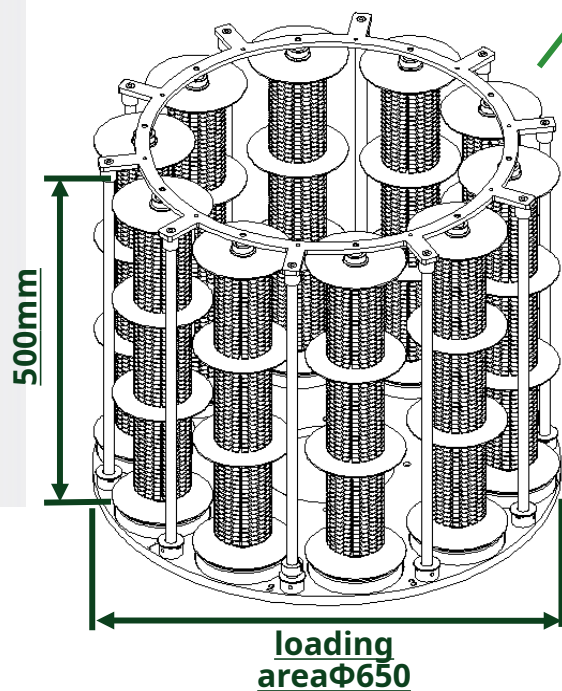
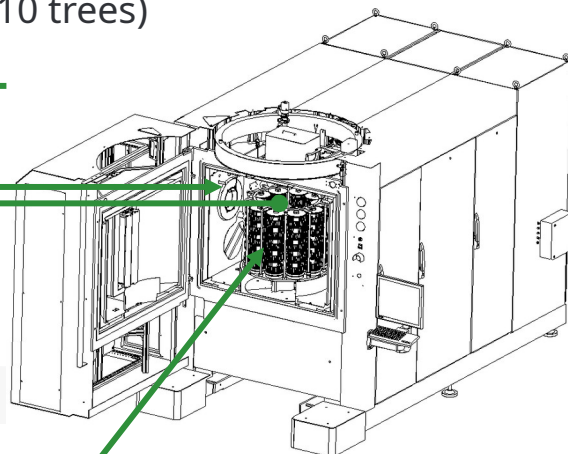
MD500 Layout



MD800Plus Equipment Parameter

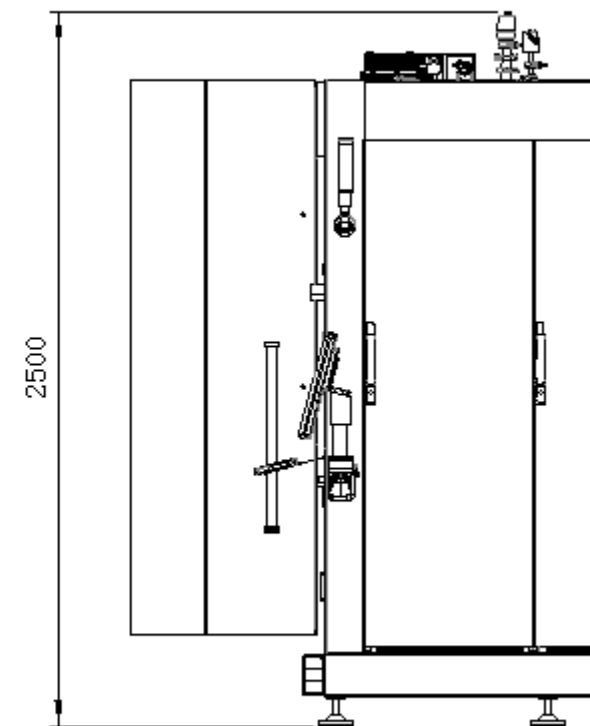
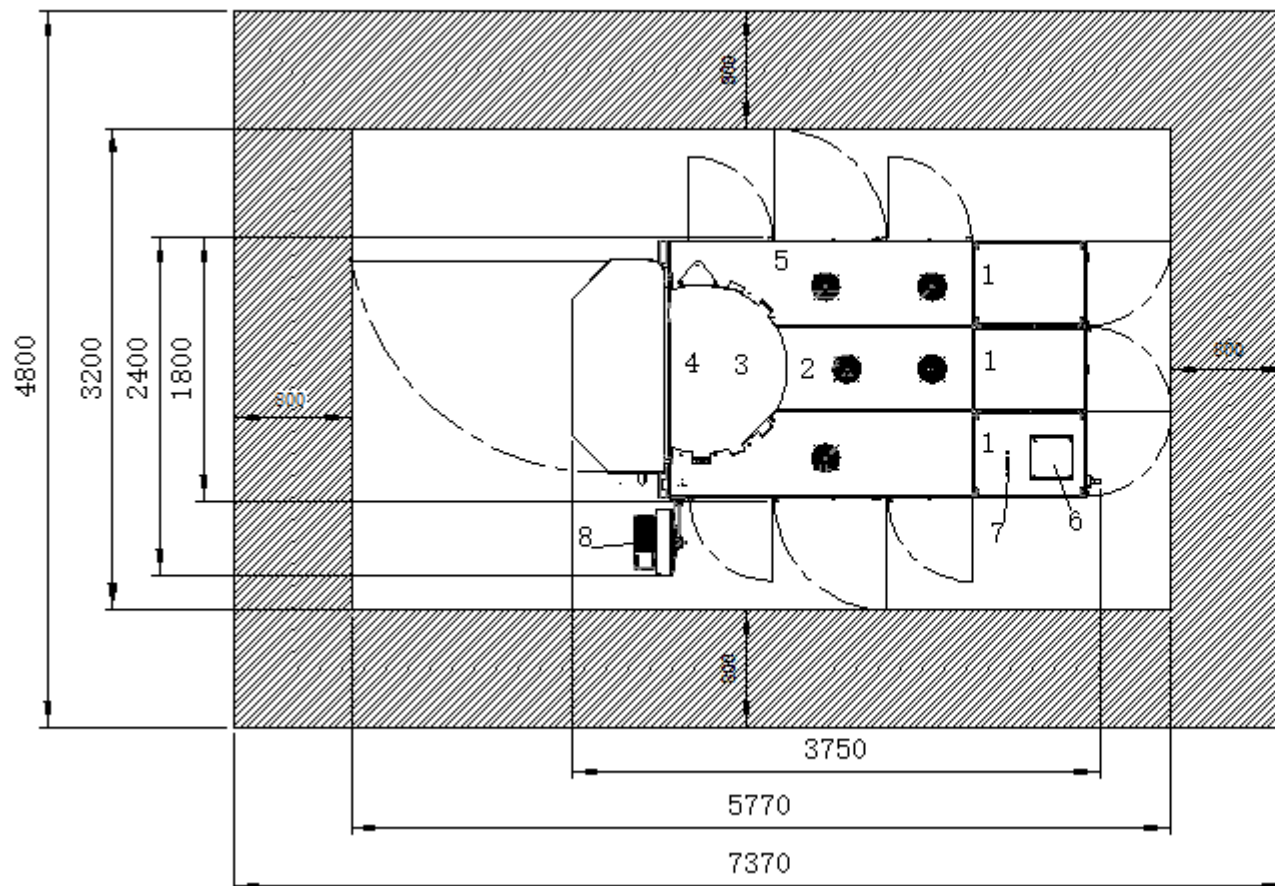
Loading capacity (10 trees)

Volume(1m³)

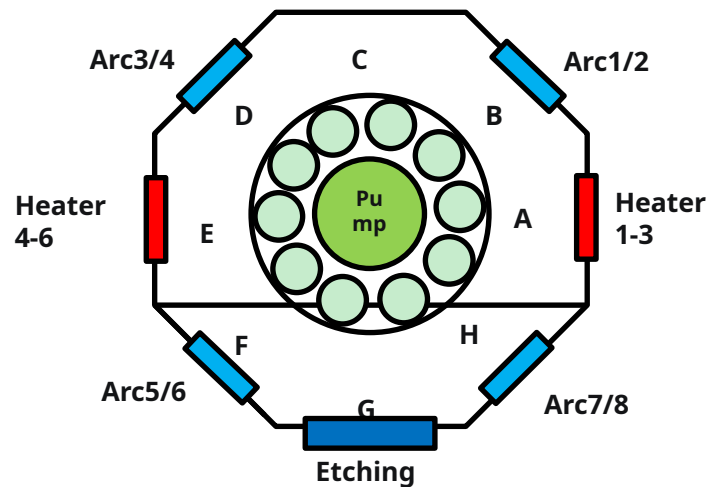
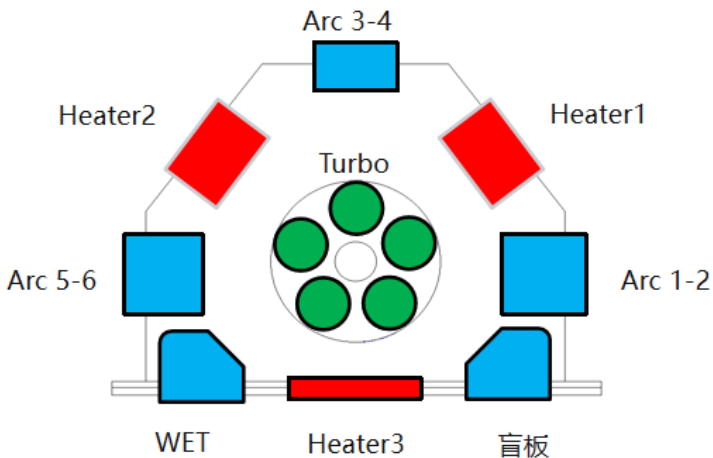
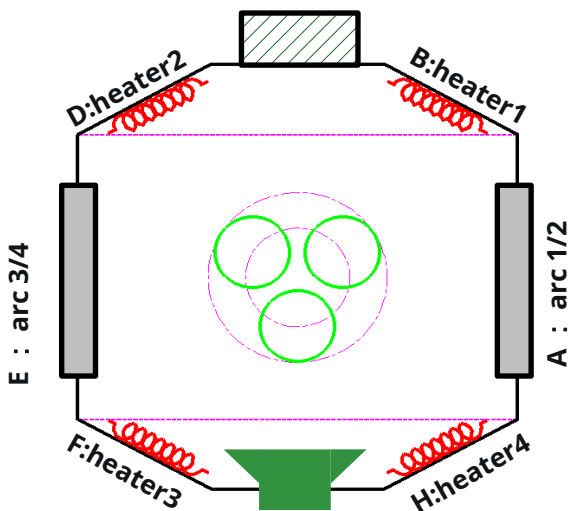


MD800PlusLayout

1. Electrical cabinet
2. Foreline pump
3. Molecular pump
4. Chamber
5. Cooling water inlet and outlet interface
6. Equipment power supply incoming electrical box
7. Process gas inlet
8. Equipment control system
9. An 800mm safety channel must Be reserved around the equipment.



Equipment Layout



Properties	MD200	MD500	MD800 Plus
Etching Modules	1set	1set	1set
Arc sources	4	6	8
Arc sources Arrangement	Vertical Arrangement	Vertical Arrangement	Vertical Arrangement
Advantage	Suitable for non-standard and resharpener tool coatings , Flexible production(catering to small outputs) , Low investment, free coating process offered	Suitable for non-standard and resharpener tool coatings , Fast deposition rate, high dissociation rate, suitable for small batch production, high stability	With large loading capacity, more output

Equipment Electrical Parameters

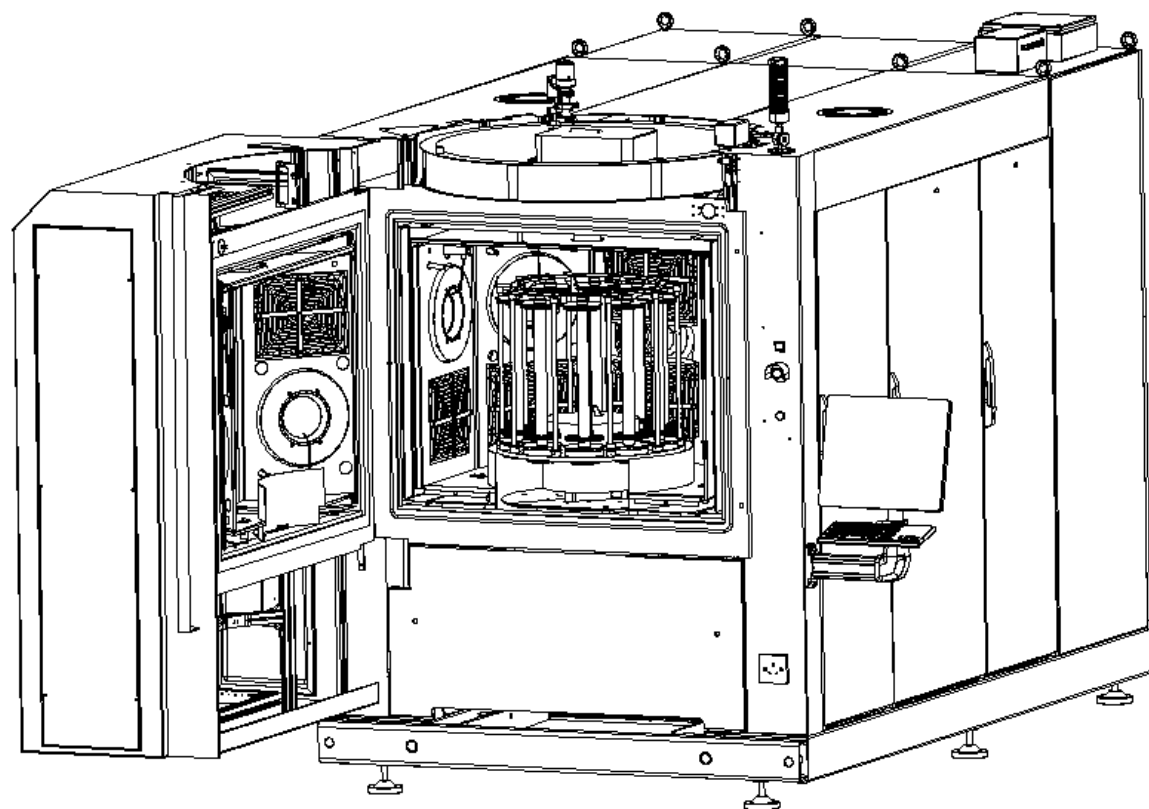
Model	MD200	MD500	MD800Plus
Voltage	3*380/220V (3L+N+PE)		
Current	3*75A	3*120A	3*120A
Power	50kW	80kW	85kW
Frequency	50/60Hz		
Water Cold22~24°C	5-5.5bar		
Compressed air	5-6.5bar		
Process gas : Ar/N ₂ /H ₂	1.0-1.2bar		

Equipment Consumption

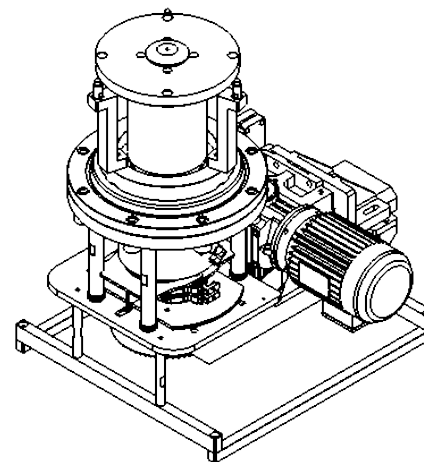


Model	MD200	MD500	MD800 Plus
Minimum Purity	Ar 99.995%		
	N ₂ 99.996%		
	H ₂ 99.995%		
	Standard Nitrogen (N ₂) 99.996%		
Consumption per batch	Ar Gas Consumption per Batch 35L	Ar Gas Consumption per Batch 35L	Ar Gas Consumption per Batch 50L
	N ₂ Gas Consumption per Batch 60L	N ₂ Gas Consumption per Batch 80L	N ₂ Gas Consumption per Batch 110L
	H ₂ Gas Consumption per Batch 8L	H ₂ Gas Consumption per Batch 10L	H ₂ Gas Consumption per Batch 15L
	Standard Nitrogen (N ₂) Gas Consumption per Batch 50L	Standard Nitrogen (N ₂) Gas Consumption per Batch 70L	Standard Nitrogen (N ₂) Gas Consumption per Batch 100L
Cooling water	Max heat discharge 40kW 80 L/min (Ullage 6 L/batch)	Max heat discharge 60kW 100 L/min (Ullage 10 L/batch)	Max heat discharge 80kW 110 L/min (Ullage 10 L/batch)
Electric power supply	Average power 40kW/h About 6h per batch (subject to the process)	Average power 50kW/h About 6h per batch (subject to the process)	Average power 65kW/h About 6h per batch (subject to the process)

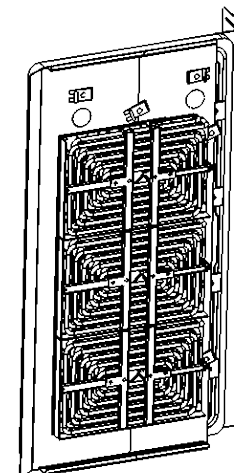
Functional Components



Device body



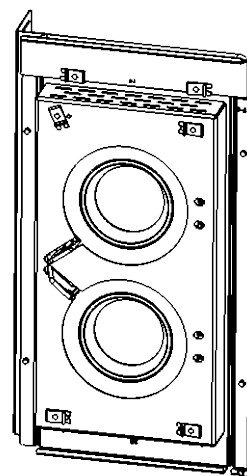
Turntable



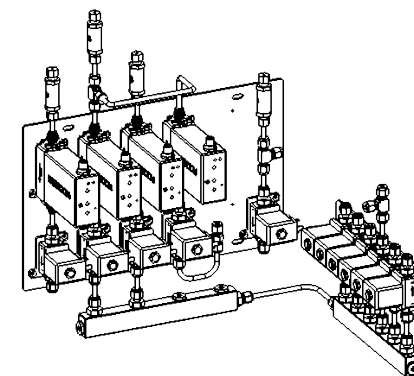
Heating module



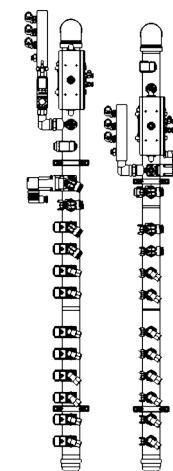
Etching module



Arc module

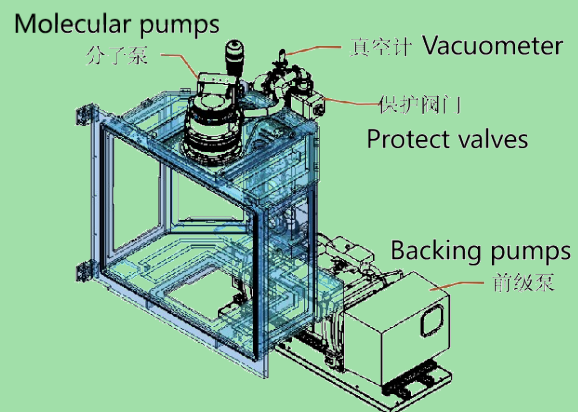


Gas module



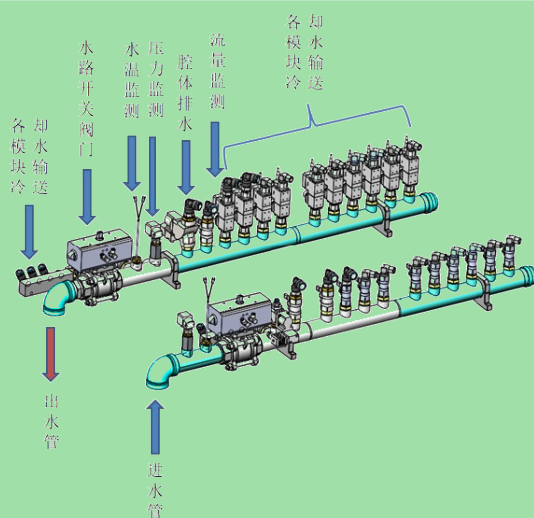
Waterway module

Vacuum system



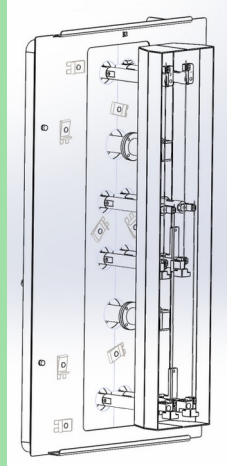
- Pump the vacuum chamber to required vacuum level for coating
- Can choose Chamber pressure control mode or flow control mode
- Achieves precise control of gases

Waterway system



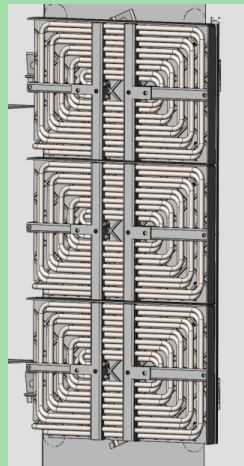
- Provide cooling water for every functional module
- Protect components and seals of each module when working at high temperature
- Each branch monitors flow and temperature individually

Ion source control system



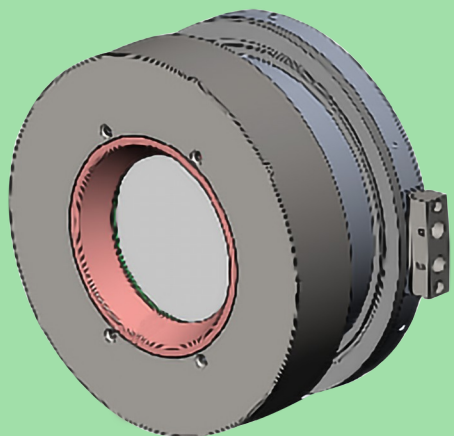
- Hot electrons are emitted through the filament to ionized argon. Under the action of negative bias, argon ions accelerate and bombard the workpiece to clean its surface of the workpiece and improve the adhesion of the film layer.

Heater temperature measurement system



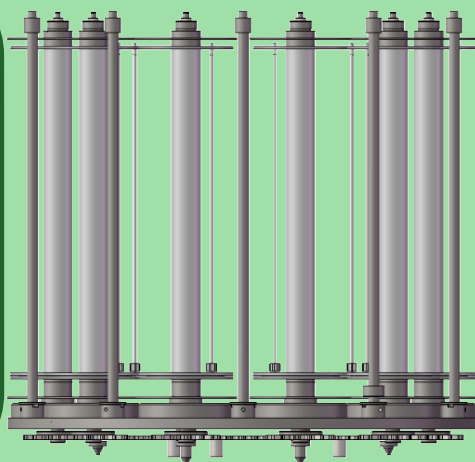
- Radiation heats the workpiece holder and the product to bake out the gas moisture inside the product structure, allowing precise temperature control of the Chamber temperature.

Arc source



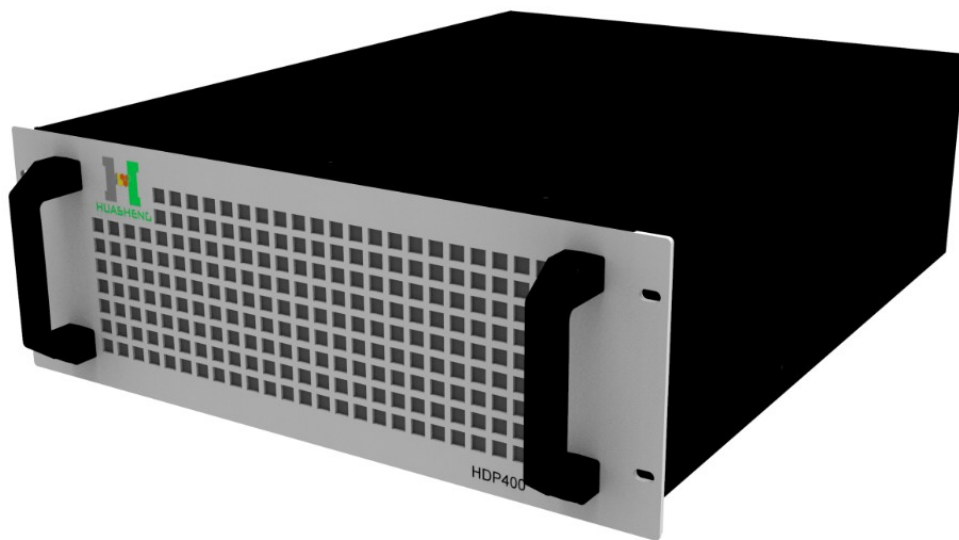
- Optimize plasma anode and improve film performance
- Fewer droplets and smoother surface
- Plasma auxiliary power supply, high target utilization rate and lower cost
- Quick-change cathode magnetic field matches different coating materials
- Hidden arc ignition structure makes maintenance easy

**Power transmission
and turret**



- Driven by a variable frequency motor, it can be continuously adjusted from 1 to 3 rpm
- The spindle adopts magnetic fluid seal
- The turntable achieves the revolution of the disk and the rotation of each tree through gear transmission

(HDP400) Arc source power supply



Project

Parameter

Voltage

73V

Power

12kW

Frequency

0.1~500Hz

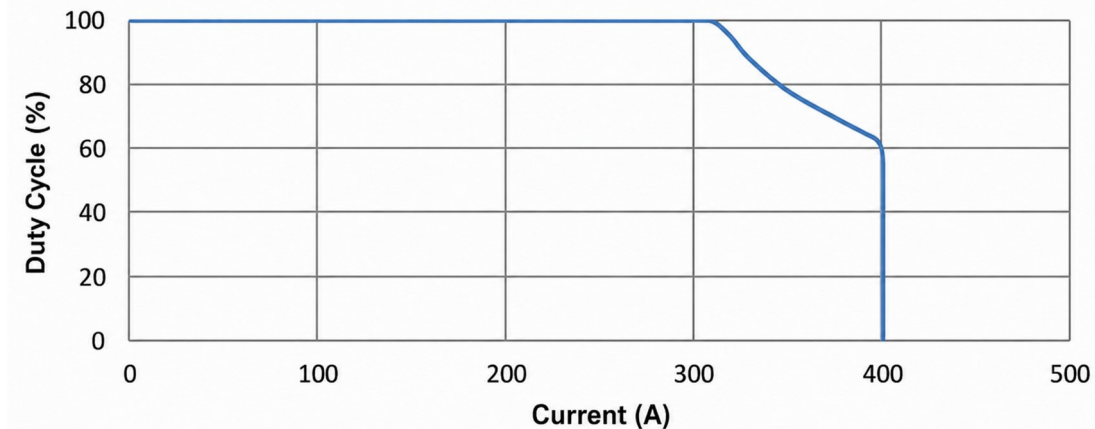
Duty cycle

5~95%

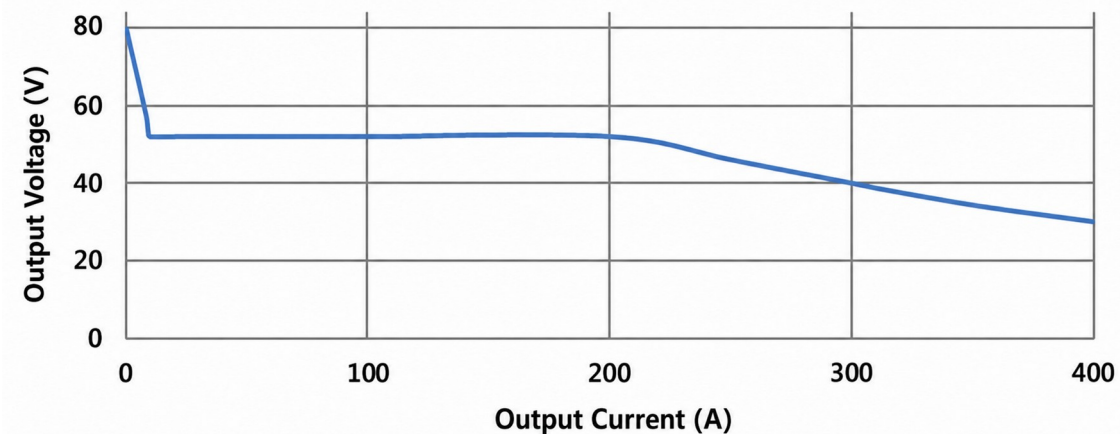
Current

50~400A

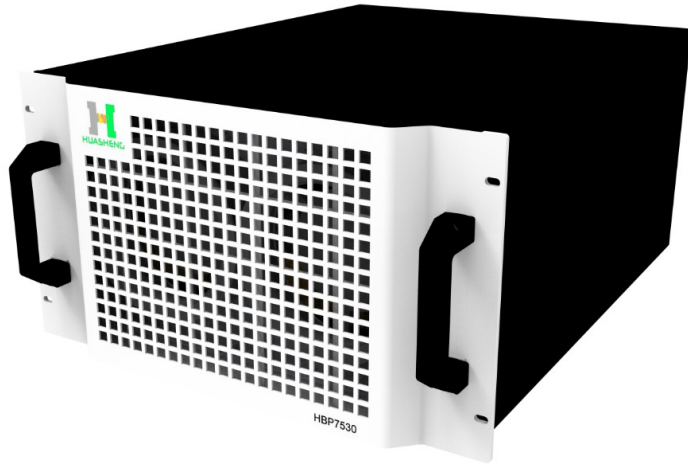
HDP400 Duty Cycle



HDP400 V-I Characteristic Curve



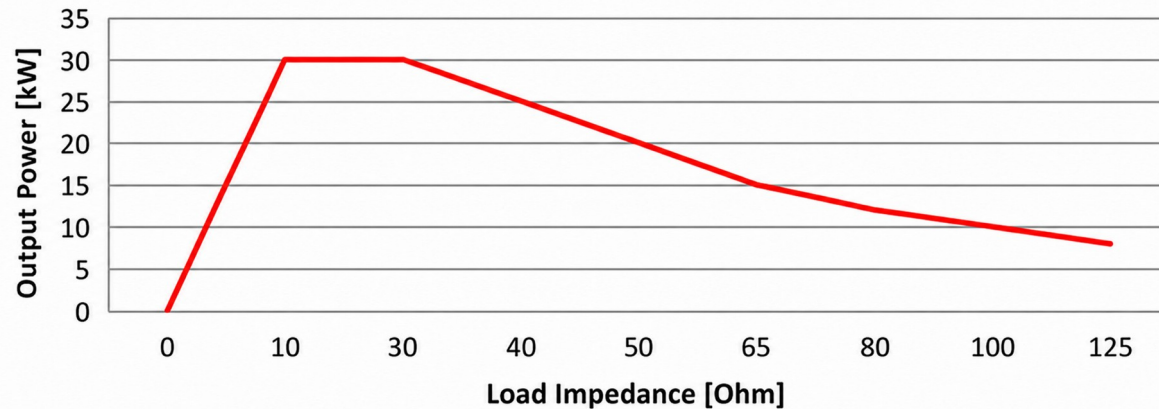
Bias power supply (Huasheng Design and production)



- Constant voltage output, providing negative bias for turntable.
- Make the workpiece clean more thoroughly and improve the adhesion of the film layer.

- During etching, argon ions are accelerated to bombard the workpiece surface.
- By changing the value of negative bias voltage, the film performance can be adjusted.

HBP7530 30KW Load Impedance Range



Project	Parameter
Voltage	20-1000VDC
Power	30kW
Frequency	1~30KHz
Duty cycle	1~99%
Current	400V/75A 1000V/30A

The list of core components (MD200)

Item	Name	Brand	Quantity	Parameter description
1	Molecular pump	Leybold	1	pumping speed 2200 L s ⁻¹ , limit pressure < 10 ⁻⁸ mbar.
2	Backing pump	Feiyue / Baosi	1	rotary vane pump + Roots pump combination pumping speed 600m ³ /h.
3	Bias power supply	Huasheng	1	HBP7530, 30kW/set, DC Pulse, DC1000V
4	arc source	Huasheng	4	Target diameter160mm , MAG3:Electromagnetic+permanent magnet
5	arc power supply	Huasheng	4	DC Pulse, 10kW, 400A, 500Hz
6	Ion source	Huasheng	1	WET Lateral Hot Filament Ion Source
7	Ion source power supply	Huasheng	1	HSP7530 (DC power supply) 30kW/75A/400V
8	flow meter	Sevenstar	4	N ₂ : 2L/1 set, Ar: 1L/1 set

The list of core components (MD200)

Item	Name	Brand	Quantity	Parameter description
9	Automation systems	Huasheng	1	Beckhoff PC/PLC, 19-inch touch screen, Siemens appliances
10	Chamber	Huasheng	1	304 stainless steel, indirect water cooling
11	Workpiece transmission system	Huasheng	1	Frequency conversion motor 1~3 revolutions, bearing 200KG, magnetic fluid seal.
12	Temperature control system	Huasheng	1	Power/temperature control mode, double-layer high-density power heater, with total power of 15kW.
13	Vacuum measurement	Inficon	1	Baratron-CDG100D IKR-MPG400 , Pirani-PSG500
14	Pneumatic control system	SMC	1	Solenoid valve, cylinder, sensor
15	Cooling control system	NNT	1	Water temperature, flow sensor, pressure sensor

The list of core components (MD500)



Item	Name	Brand	Quantity	Parameter description
1	Molecular pump	Leybold	1	pumping speed 2200 L s ⁻¹ , limit pressure < 10 ⁻⁸ mbar.
2	Backing pump	Feiyue / Baosi	1	rotary vane pump + Roots pump combination pumping speed 600m ³ /h.
3	Bias power supply	Huasheng	1	HBP7530, 30kW/set, DC Pulse, DC1000V
4	arc source	Huasheng	6	Target diameter160mm , MAG3:Electromagnetic+permanent magnet
5	arc power supply	Huasheng	6	DC Pulse, 10kW, 400A, 500Hz
6	Ion source	Huasheng	1	WET Lateral Hot Filament Ion Source
7	flow meter	Sevenstar	4	N ₂ : 2L/1 set, Ar: 1L/1 set

* 具体详见技术协议
*Subject to the technical agreement

The list of core components (MD500)

Item	Name	Brand	Quantity	Parameter description
8	IPC	Huasheng	1	Beckhoff PC/PLC, 19-inch touch screen, Siemens appliances
9	Chamber	Huasheng	1	304 stainless steel, indirect water cooling
10	Workpiece transmission system	Huasheng	1	Frequency conversion motor 1~3 revolutions, bearing 300KG, magnetic fluid seal.
11	temperature control system	Huasheng	1	Power/temperature two control modes, double-layer high-density power heater, total power 24kW
12	Vacuum measurement	Inficon	1	Baratron-CDG100D IKR-MPG400 , Pirani-PSG500
13	pneumatic control system	SMC	1	Solenoid valve, cylinder, sensor
14	Cooling control system	NNT	1	Water temperature and flow sensor, pressure sensor

The list of core components (MD800Plus)



Item	Name	Brand	Quantity	Parameter description
1	Molecular pump	Leybold	1	pumping speed 2200 L s ⁻¹ , limit pressure < 10 ⁻⁸ mbar.
2	Backing pump	Feiyue / Baosi	1	rotary vane pump + Roots pump combination pumping speed 600m ³ /h.
3	Bias power supply	Huasheng	1	HBP7530, 30kW/set, DC Pulse, DC1000V
4	arc source	Huasheng	8	Target diameter160mm , MAG3:Electromagnetic+permanent magnet
5	arc power supply	Huasheng	8	DC Pulse Power Supply, Power: 12kW, Current: 4-400A Voltage: 73VDC, Frequency: 0.1-500Hz
6	Ion source	Huasheng	1	WET Lateral Hot Filament Ion Source
7	flow meter	Sevenstar	3	N ₂ : 2L/1 set, Ar: 1L/1 set

* 具体详见技术协议
*Subject to the technical agreement

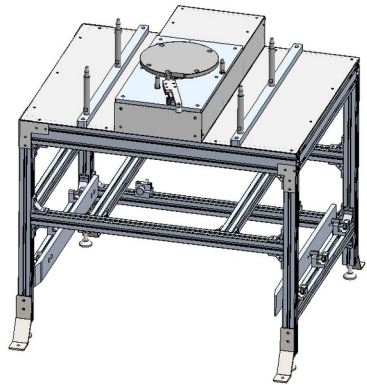
The list of core components (MD800Plus)

Item	Name	Brand	Quantity	Parameter description
8	IPC	Huasheng	1	Beckhoff PC/PLC, 19-inch touch screen, Siemens appliances
9	Chamber	Huasheng	1	304L material , Water cooling
10	Workpiece transmission system	Huasheng	1	Frequency conversion motor 1~3 revolutions, bearing 300KG, magnetic fluid seal.
11	temperature control system	Huasheng	1	Power/temperature control mode, double-layer high-density power heater, with total power of 30kW.
12	Vacuum measurement	Inficon	1	Baratron-CDG100D IKR-MPG400 , Pirani-PSG500
13	pneumatic control system	SMC	1	Solenoid valve, cylinder, sensor
14	Cooling control system	NNT	1	Water temperature and flow sensor, pressure sensor

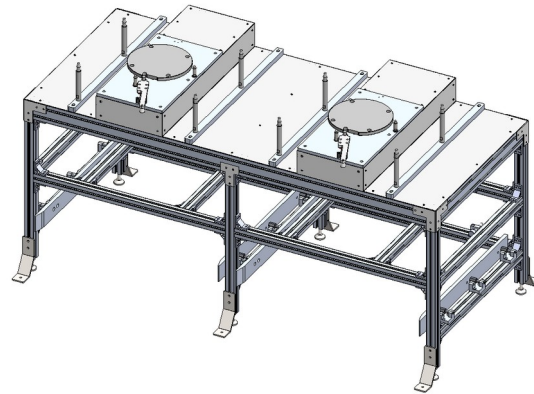
*Subject to the technical agreement

Optional Accessories

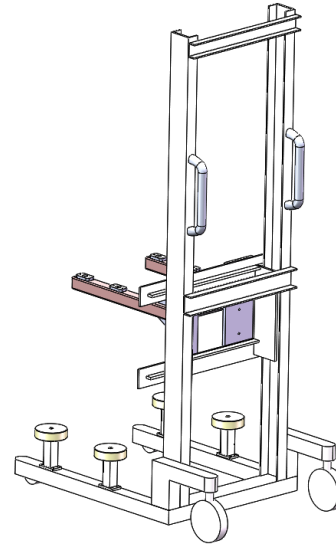
- Work bench for one operator



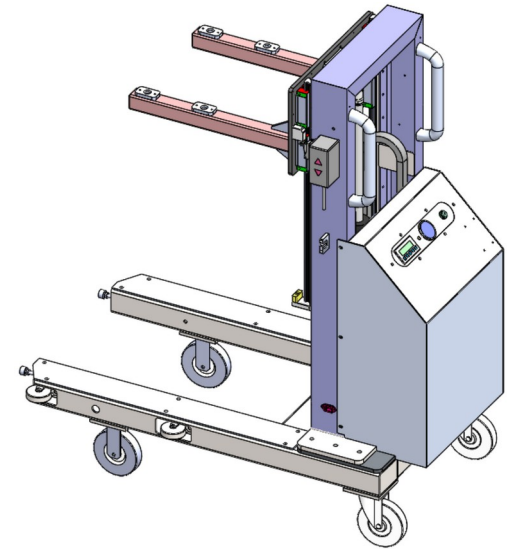
- Work bench for two operators



- Forklift for loading and unloading carousal (manually operated)



- Forklift for loading and unloading carousal (semi-automatic mode)

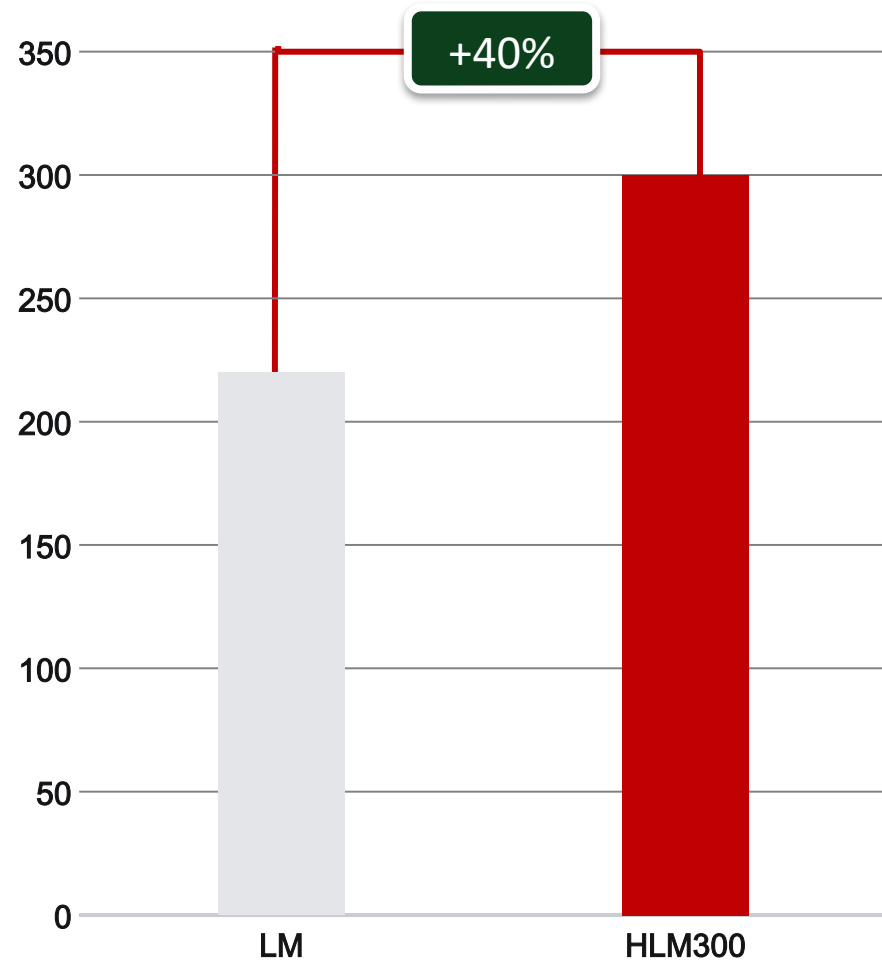


04

MD Series Equipment Application

Case : Carbon Steel (P20) Milling

Tool life/min



Tool data : OMPQ-4E-100

Workpiece : P20 HRC32

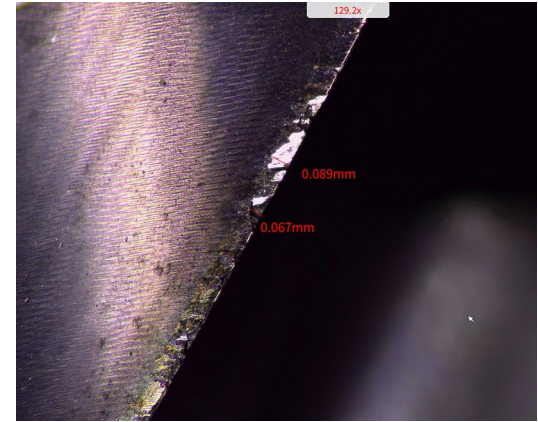
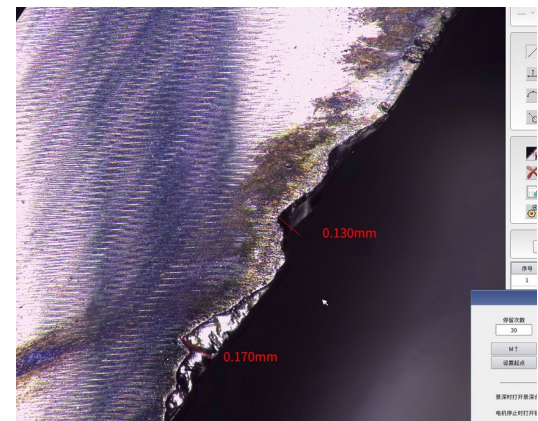
Cutting data

- Processing :
Milling - Slotting
- Cutting speed $V_c = 110\text{m/min}$
- Feeding $F_z = 0.04\text{mm}$
- Cutting depth $a_p = 3\text{mm}$
- Cutting width $a_e = 10\text{mm}$
- Cooling : Cutting fluid

Tool removal: flank wear width $V_b \geq 0.08\text{mm}$.

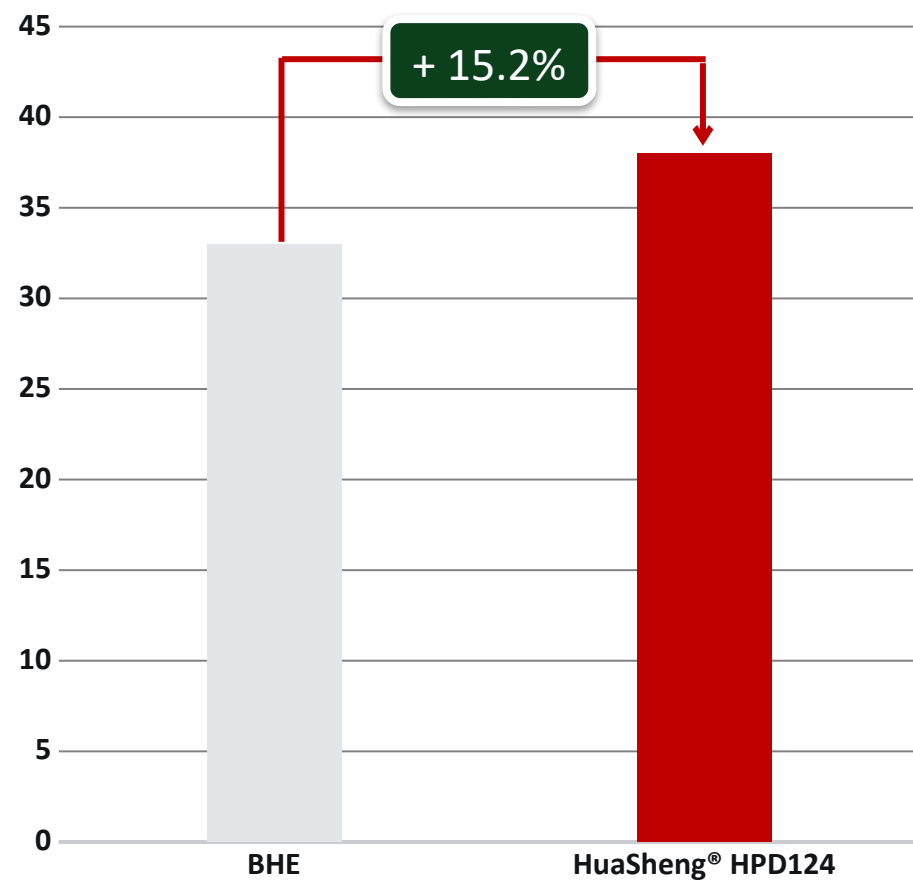
- The HLM300 coated tool can process for 300 minutes, while the competing coated tool can only process for 220 minutes. Additionally, the HLM300 coating exhibits less wear and the cutting edge remains more intact.

Date source:Terminal Laborotary

HLM300
300min WearCompetitor Product
220min Wear

Case : Stainless steel(304) drilling

Tool life/m

**Tool data :**

- D6*82

Workpiece:304 (HB200)

- GB : 06Cr19Ni10 ; JIS : SUS304

Cutting data:**Blind Hole Drilling**

- **Cutting speed** $V_c = 30\text{m/min}$
- **Feeding** $F_n = 0.1\text{mm/r}$
- **Cooling** : water

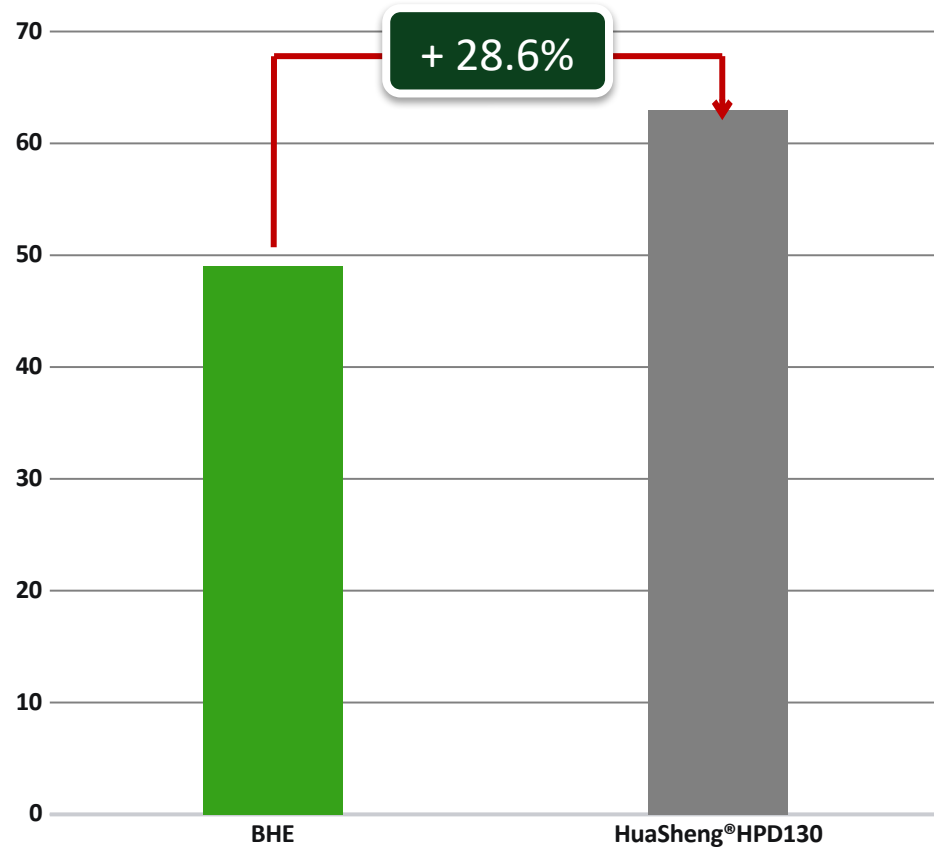
Test results :

- Huasheng's HPD124 coated tool can achieve a cutting life of 38 meters
- The coated tool from competitor BHE offers a cutting life of 33 meters
- The cutting life has been improved by 15.2%

Resource: Huasheng cutting center

Case :Alloy Steel (42CrMo) Drilling

Tool life/m



Tool data :

- D5.1*28*D6*66

Workpiece:

42CrMo (38-42HRC)

- GB : 42CrMo
- ASME : 4140
- JIS : SCM440

Cutting data : Blind Hole Drilling

- Cutting speed $V_c = 70\text{m/min}$
- Feeding $F_n = 0.15\text{mm/r}$
- Cooling : External cooling , Emulsion

Result :

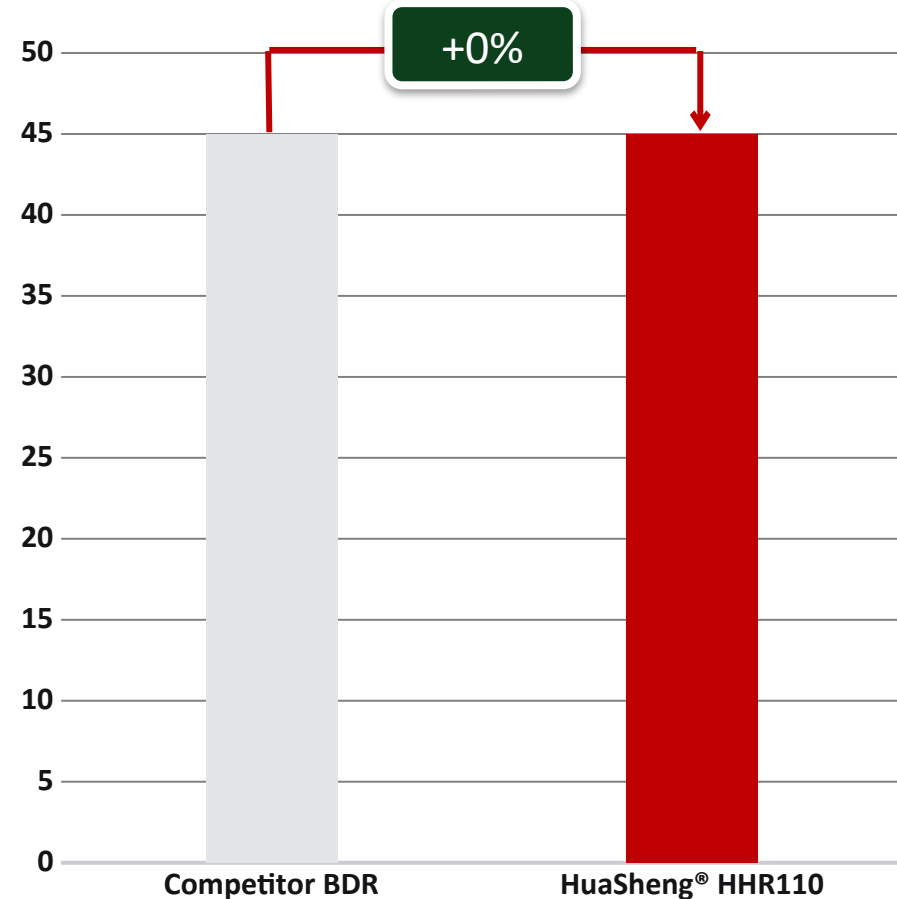
- Huasheng's HPD130 coated tool can achieve a cutting life of 63 meters
- The coated tool from competitor BHE offers a cutting life of 49 meters
- The cutting life has been improved by 28.6%

Resource : Huasheng cutting center

45m Wear Chart-
HPD13035m Wear Chart-
BHE

Case :Mould steel (SKD11) Milling

Tool life/min



Tool : D6

Workpiece: SKD11 (58-62HRC)

Cutting data : Side milling

- Cutting speed $V_c = 75.4\text{m/min}$
- Feeding $F_z = 0.094\text{mm}$
- Cutting depth $a_p = 6.0\text{mm}$
- Cutting width $a_e = 0.1\text{mm}$
- Cooling : Air

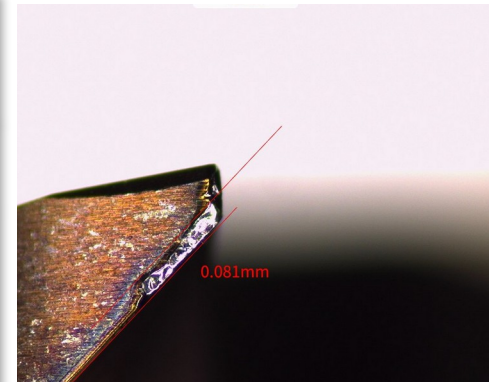
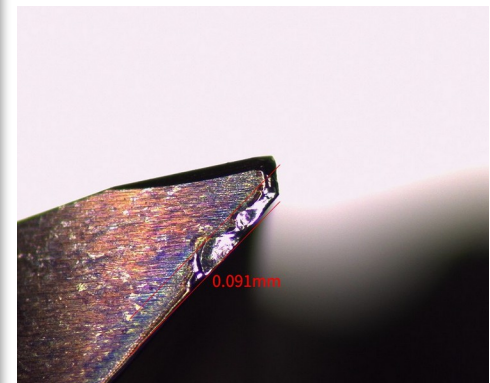
Test result :

Flank wear $> 0.8\mu\text{m}$

- The cutting life of Huasheng HHR110 coated tools is consistent with that of competing tools.

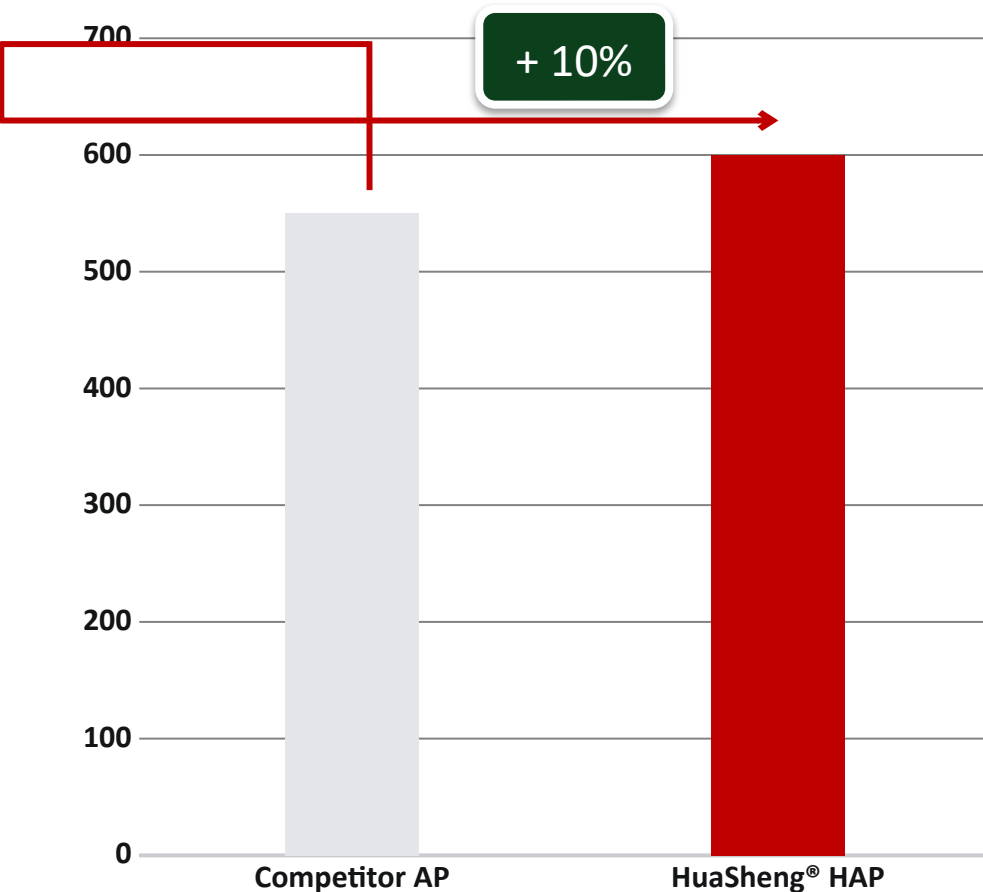
Additionally, the flank wear on the Huasheng HHR110 tools is relatively minor.

Date source:Terminal Laborotary

45min Wear Chart-
HHR11045min Wear Chart-
Competing
Product

Case : Carbon Steel (P20) Milling

Tool life/min

**Tool data :**

- D6R3*50 OKE 800#

Workpiece:

- P20 (35-37 HRC)

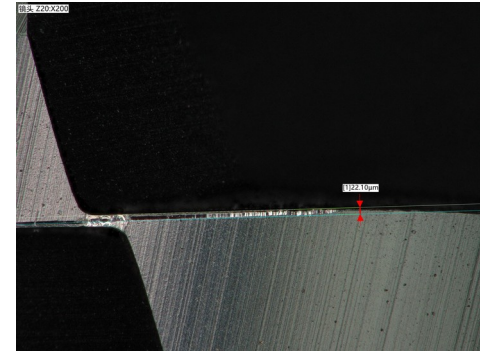
Cutting data: milling

- Cutting speed $V_c = 188.4\text{m/min}$
- Feeding $F_z = 0.15\text{mm}$
- Cutting depth $a_p = 0.1\text{mm}$
- Cutting width $a_e = 0.12\text{mm}$
- Cooling : water

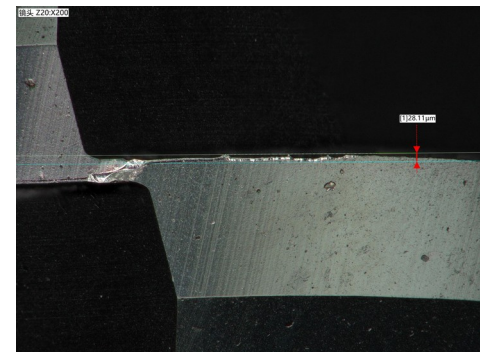
Evaluation Standard : Compare the width of the wear land on the flank face.

- Huasheng HPR125 coated tool machined 600 min
- AP coated tool machined 550 min
- 10% increase in cutting life

Resource : Huasheng cutting center



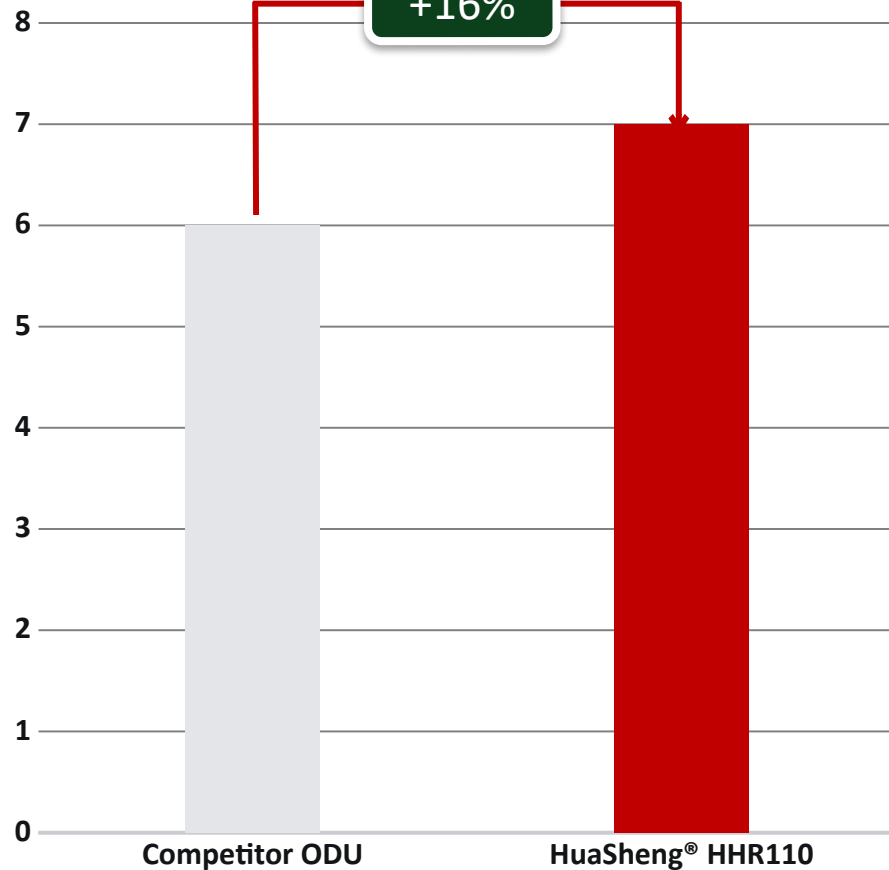
**300min Wear Chart
(22.1μm)-HPR125**



**300min Wear
Chart(28.11μm)-AP**

Case :Tool steel (SKH-9) Milling

Tool life/h



Tool data : D4R2

Workpiece: SKH-9 (58-62HRC)

Cutting data : side milling

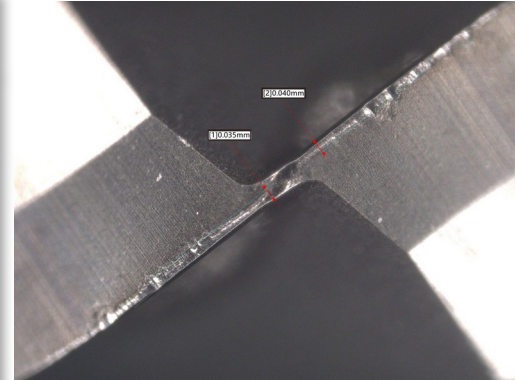
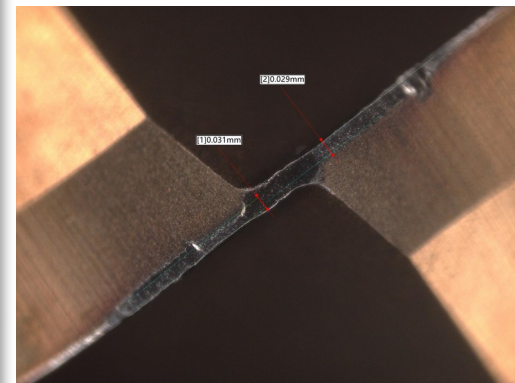
- Cutting speed $V_c = 126\text{m/min}$
- Feeding $F_z = 0.15\text{mm/z}$
- Cutting depth $a_p = 0.04\text{mm}$
- Cutting width $a_e = 0.1\text{mm}$
- Cooling : Air

Test results :

- Tool removal: : The surface roughness of the workpiece $R_a > 0.8\text{ }\mu\text{m}$.
- After 7 hours of cutting with the Huasheng HHR110 coated tool, the rear flank wear is 0.031mm .
- After 6 hours of cutting with the competitor's coated tool, the flank wear is 0.035mm .

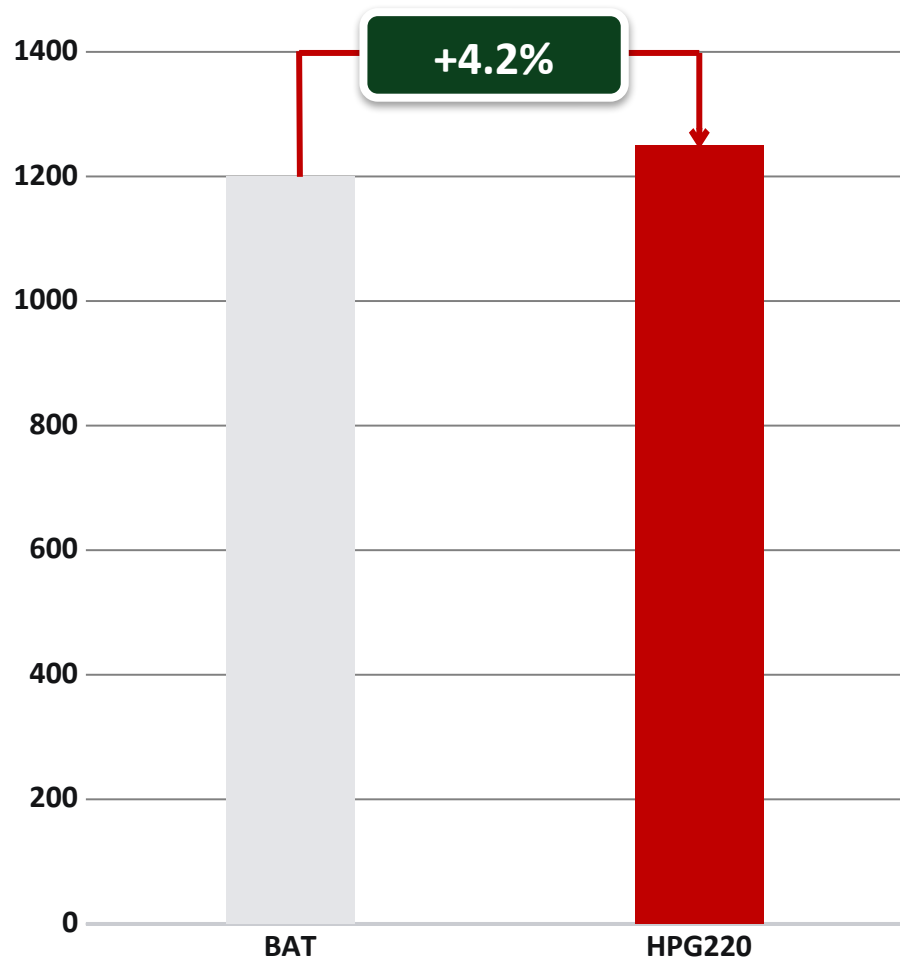
The HHR110 exhibits less and more uniform wear compared to competing products..

Date source:Terminal Laborotary

300min Wear Chart-
ODU300min Wear Chart-
HHR110

Case : Hobbing high-speed gear processing

Tool life/min

**Tool data :**

- G90 180×80

Workpiece:

- 20CrMoTi(48-60HRC)

Cutting data :**hobbing**

- Cutting speed V_c : 250m/min
- Cooling : dry cold

working criteria :

Gear tooth surface not conforming to standards/1200 PCS

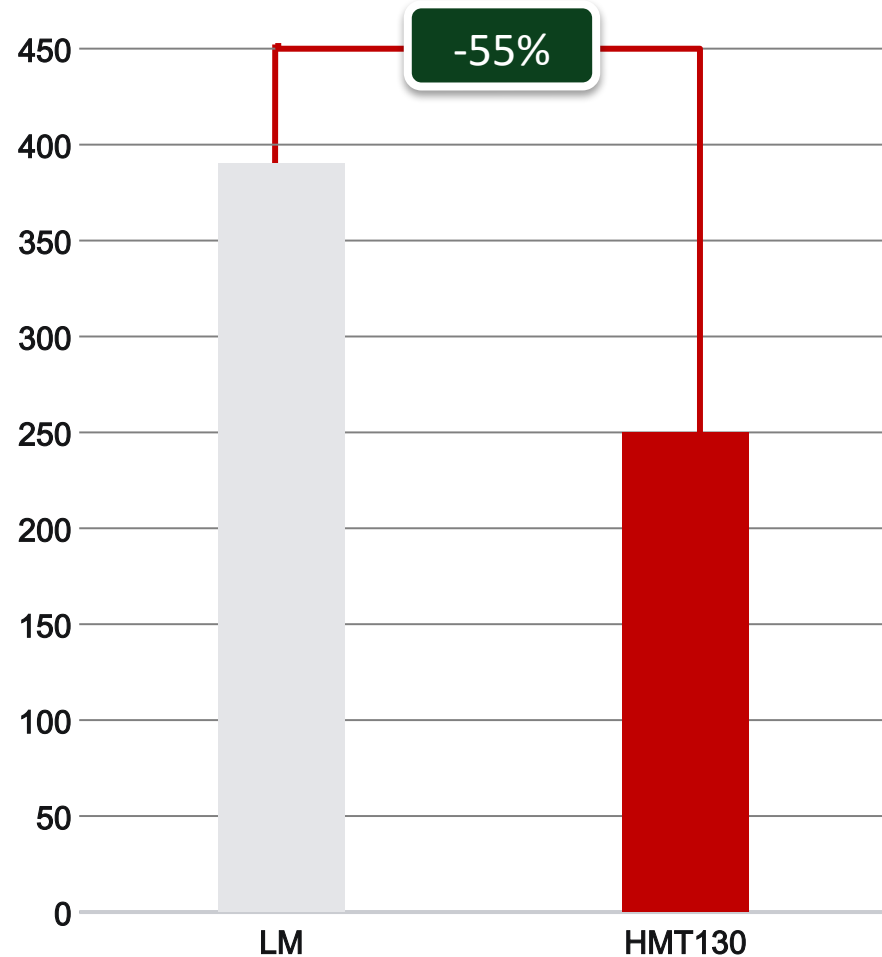
Results : BAT's Ultimate Life : 1200PCS

- HPG220's Ultimate Life : 1250PCS
- tool life Increase of 4.2%

Data source: terminal data

Case : Stainless Steel (316L) Turning

Wear value/ μm



Blade Model :

- WNMG080408-OMM

Workpiece :

316L stainless steel (< 200HB)

- ASME : AISI316L
- JIS : SUS316L

Test condition:turning

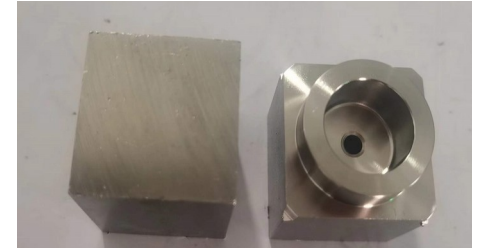
- cutting speed $V_c = 202\text{m/min}$
- feed speed $F_z = 0.15\text{mm/z}$
- cutting depth $a_p = 1.0\text{-}2.5\text{mm}$
- cooling method : Emulsion

Result :

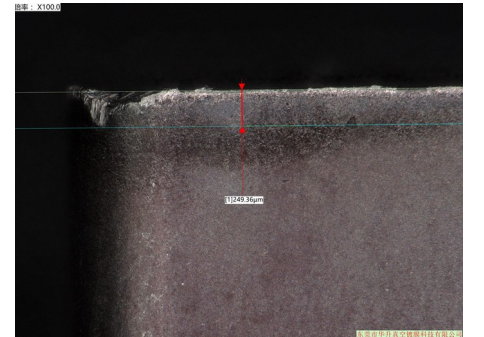
After 18 minutes cutting :

- The wear of Huasheng's HMT130 coated tool is 249 μm
- The wear of the coated tool from competitor LM is 386 μm
- The cutting wear has been reduced by 55%

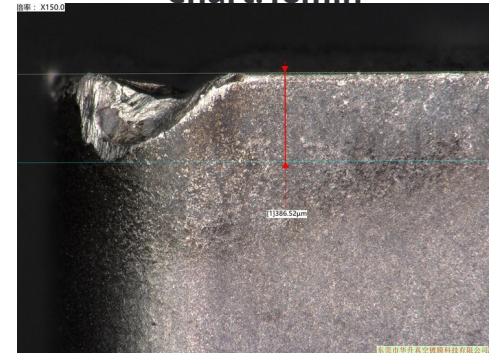
Date source:Terminal



Images of Machined 316L
Stainless Steel Parts



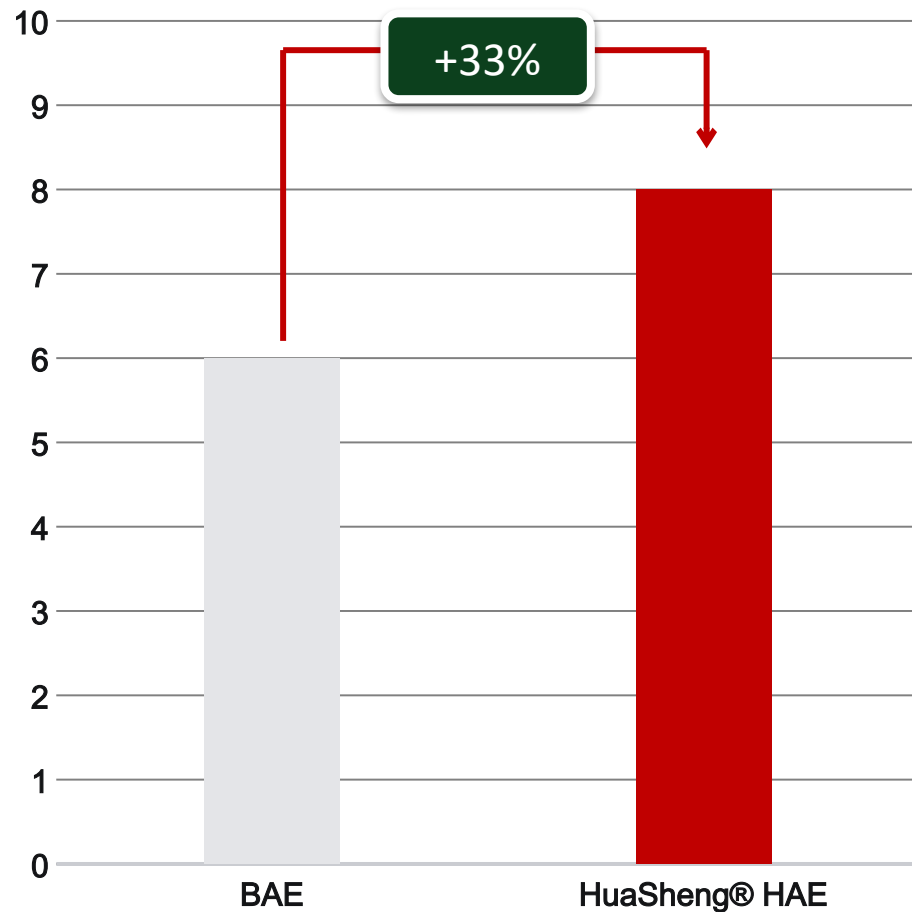
HuaSheng®HMT130 Wear
Chart:18min



Competitor®LMWear Chart :18min

Case :Carbon steel (45) Milling

Tool life/h



Chip Type :

- APMT1135PDER , 刀杆 D17

Machined material:

45# (< 200HB)

- ASME : 1045
- JIS : S45C

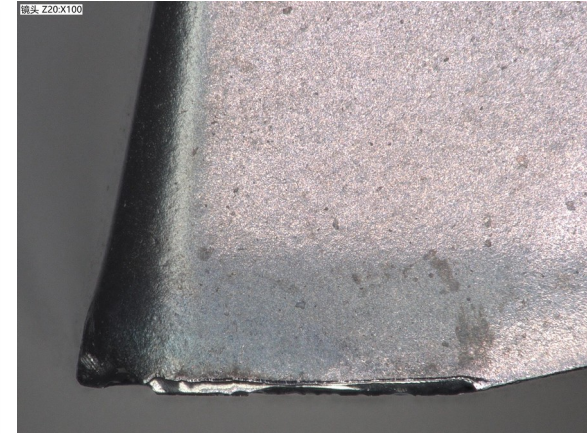
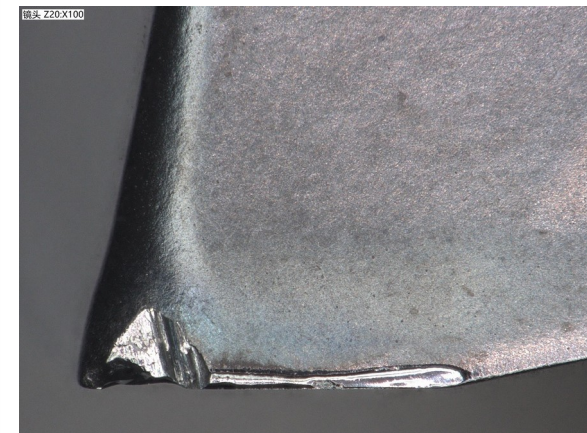
Test condition: end face milling

- cutting speed $V_c = 117\text{m/min}$
- feed speed $F_z = 0.57\text{mm/z}$
- cutting depth $a_p = 0.3\text{mm}$
- cutting width $a_e = 12.75\text{mm}$
- cooling method : (air cooling)

testing result :

- Huasheng's HAE coated tool can achieve a cutting life of 8 hours
- The coated tool from competitor BAE offers a cutting life of 6 hours
- The cutting life has been improved by 33%

Date source: HuaSheng Cutting Laboratory

8h Wear Chart-
HAE

6h Wear Chart-BAE

Customized equipment





Your Ideas, Our Solution

THANKS