

2026

HUASHENG TC800 PLUS-F Diamond-Like Carbon Coating Equipment

To be the top surface solution supplier in the world

Striving for reduction of industrial energy consumption



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01

TC800 PLUS-F Equipment Introduction

TC800 PLUS-F Equipment Introduction

Huasheng independently developed a new hybrid equipment **TC800 PLUS-F**, which combines the technical advantages of ion sources, magnetron sputtering and magnetic filtration. By utilizing a highly efficient magnetic filtration system and an electromagnetic scanning system, it effectively removes impurities such as neutral particles and large ion clusters, significantly improving the purity of the plasma beam. This results in denser coatings with higher hardness and superior wear and corrosion resistance. Capable of rapid deposition: high-hardness, low-friction-coefficient diamond-like carbon (ta-C) coatings.

Equipment Characteristics

Plasma Etching

- ✓ High-energy plasma, highly effective cleaning products
- ✓ Atomic-level surface etching that preserves the original surface roughness
- ✓ Convenient and flexible post-treatment maintenance

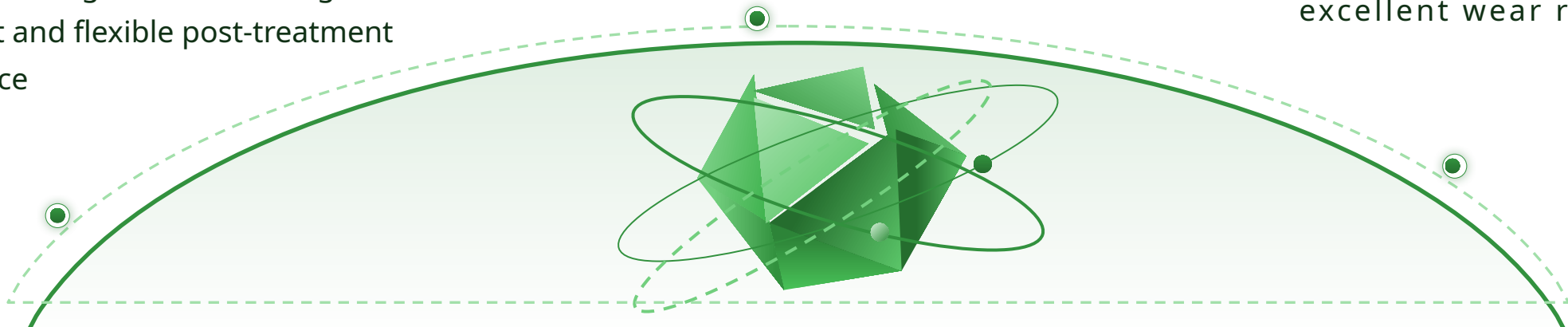
Transition Deposition: Sputtering

- ✓ Unbalanced magnetic field design, high target material utilization
- ✓ Transition layer options: Cr 、 WC 、 Ti...
- ✓ High-quality coating, lower film stress

Layer Magnetron

ta-C Layer: Magnetic Filtration

- ✓ 2 graphite multi-arc targets
- ✓ Ultra-clean and smooth
- ✓ Strong adhesion and high density
- ✓ High coating hardness and excellent wear resistance

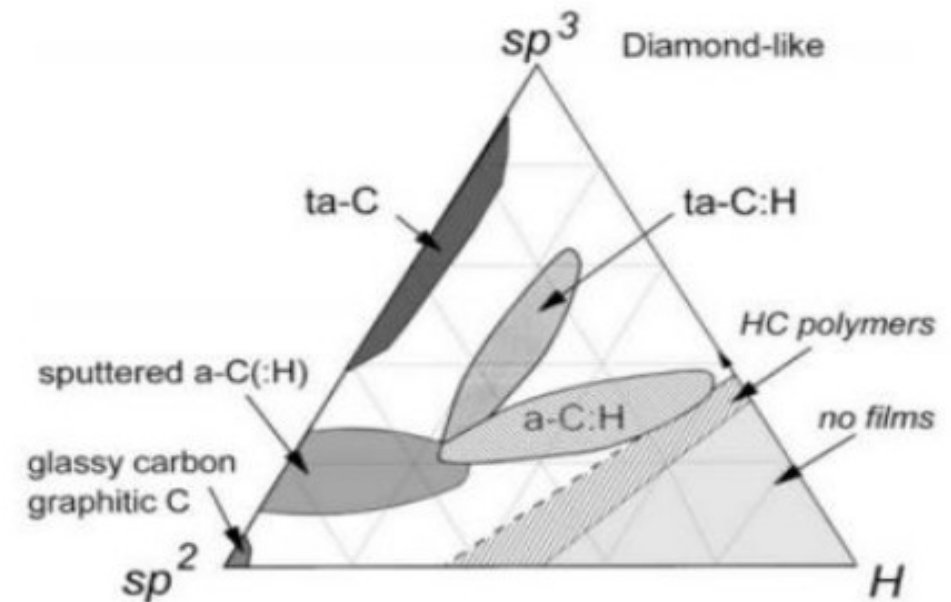


TC800 PLUS-F Equipment Introduction

ta-C coating is a type of diamond-like carbon (DLC) coating, also known as tetrahedral amorphous carbon (TAC). With an sp^3 bond content of 80% to 90%, it exhibits extremely high hardness. This coating offers high hardness, excellent wear resistance, a high elastic modulus, and a low coefficient of friction, making it widely used in applications such as cutting tools, molds, automotive components, medical devices, and industrial parts.

ta-C Coating Characteristics

- Ultra-high coating hardness with excellent wear resistance
- Outstanding corrosion resistance against various acids and alkalis
- Excellent anti-adhesion and anti-seizure performance on metals, plastics, rubber, ceramics and other materials
- Superior substrate adhesion, can be deposited on various steels, titanium alloys, cemented carbides and other materials



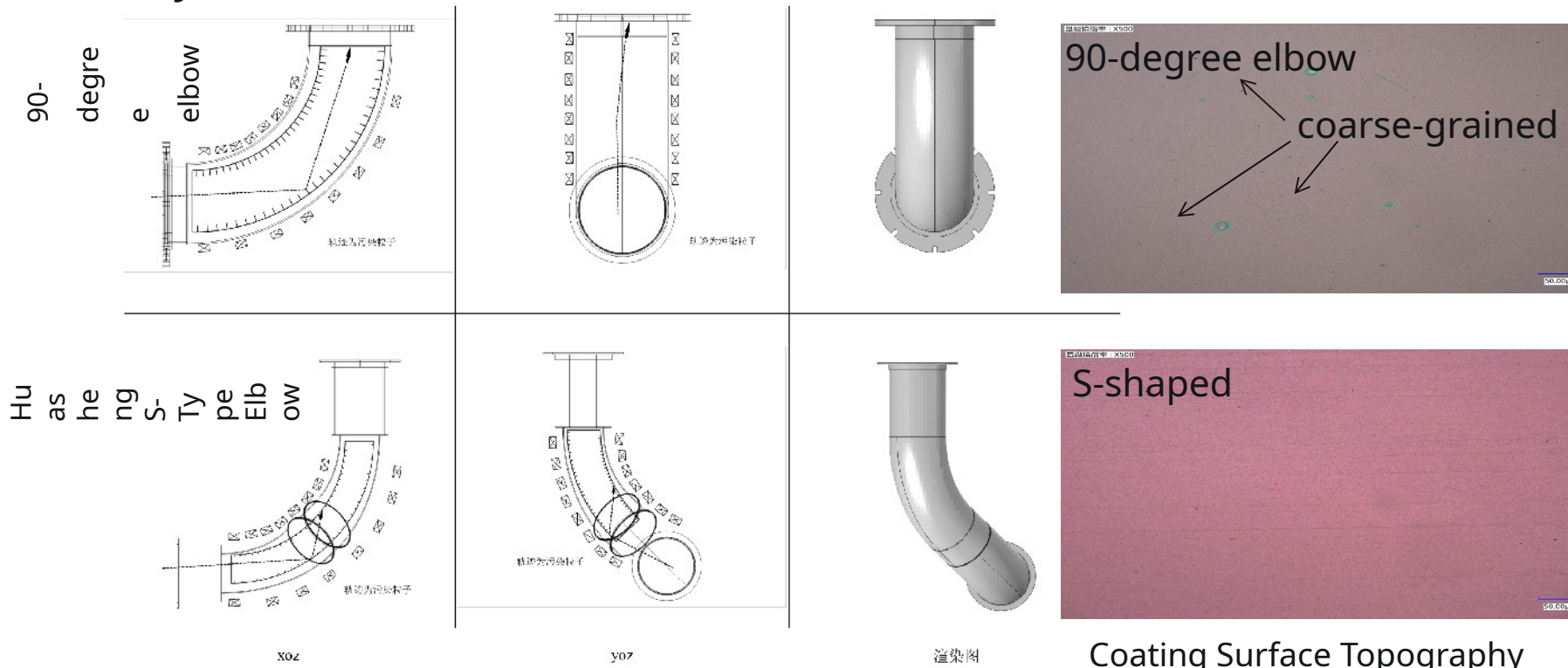
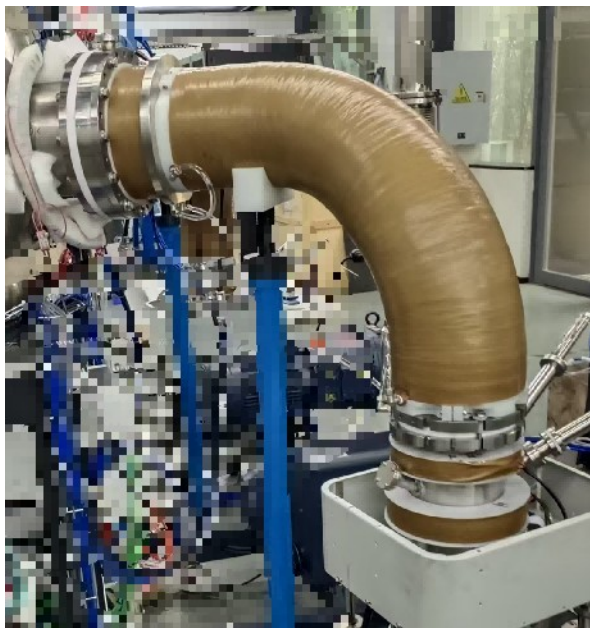
DLC Ternary Phase Diagram

02

TC800 PLUS-F Equipment Characteristics

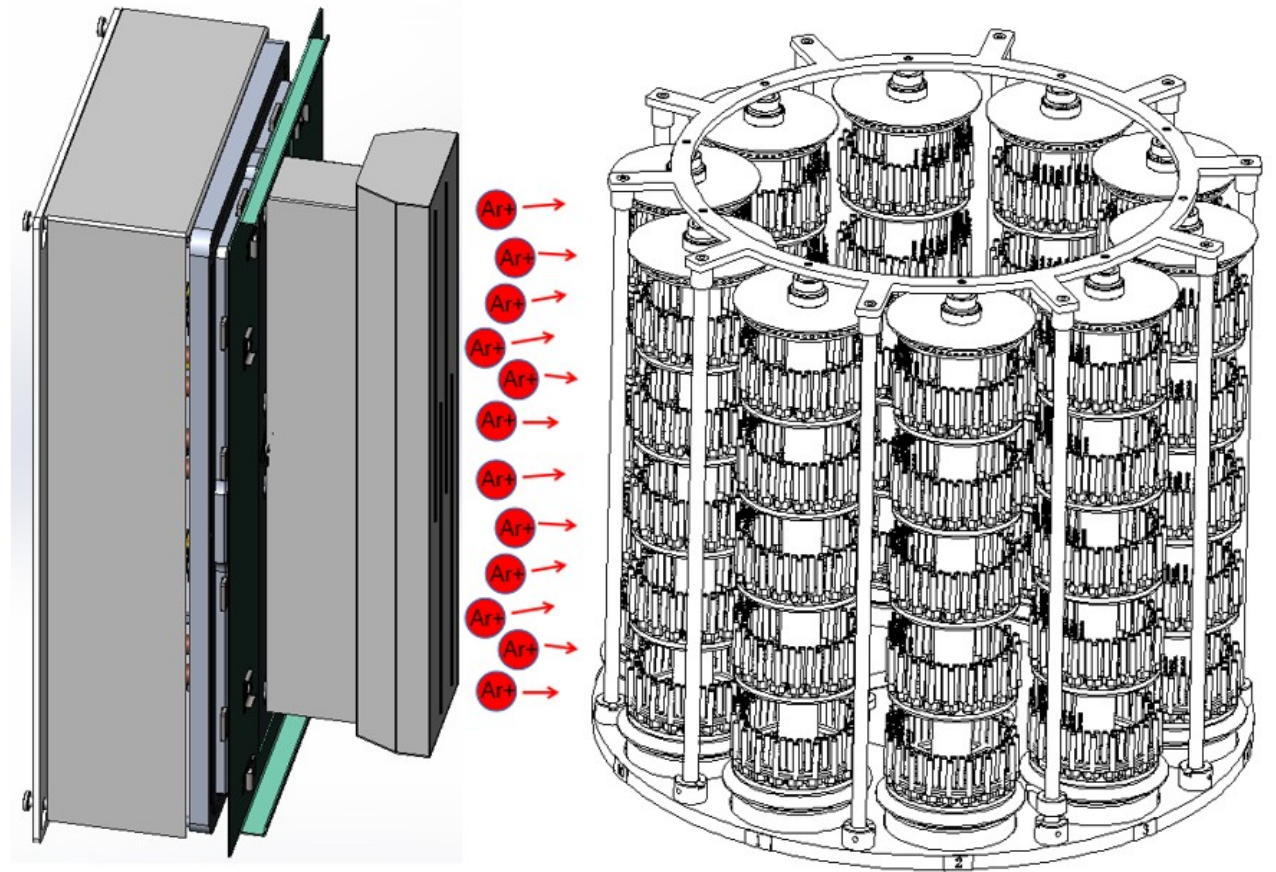
Technical Characteristics of HUASHENG S-shaped Filtered Arc

- The two bends of the S-shaped elbow are located on different planes, which can maximally block large particles from refracting into the vacuum chamber, delivering superior film quality
- The S-shaped elbow is designed with two 125° gentle bends for a more uniform magnetic field, high carbon ion transmission rate and higher coating efficiency
- The electromagnetic filtration system filters out large-particle ion clusters and atomic groups, ensuring a dense film layer with excellent adhesion
- The electromagnetic scanning system enables fixed-point and timed control of the plasma beam direction, greatly improving coating uniformity



HUASHENG Lateral Etching Technology Characteristics

- Excellent etching uniformity
- Excellent etching diffraction
- Adjustable etching intensity
- Maintenance-free etching module

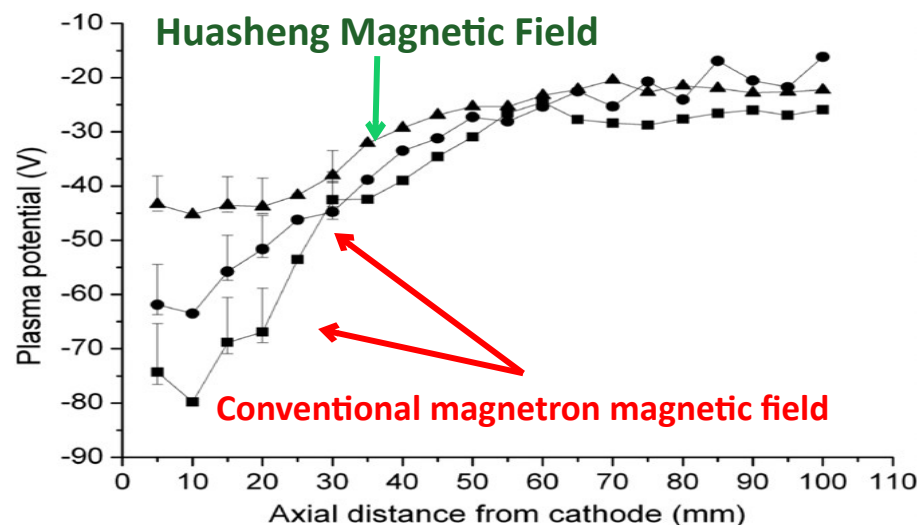


WET Etching Module

HUASHENG Magnetron Sputtering Cathode Characteristics

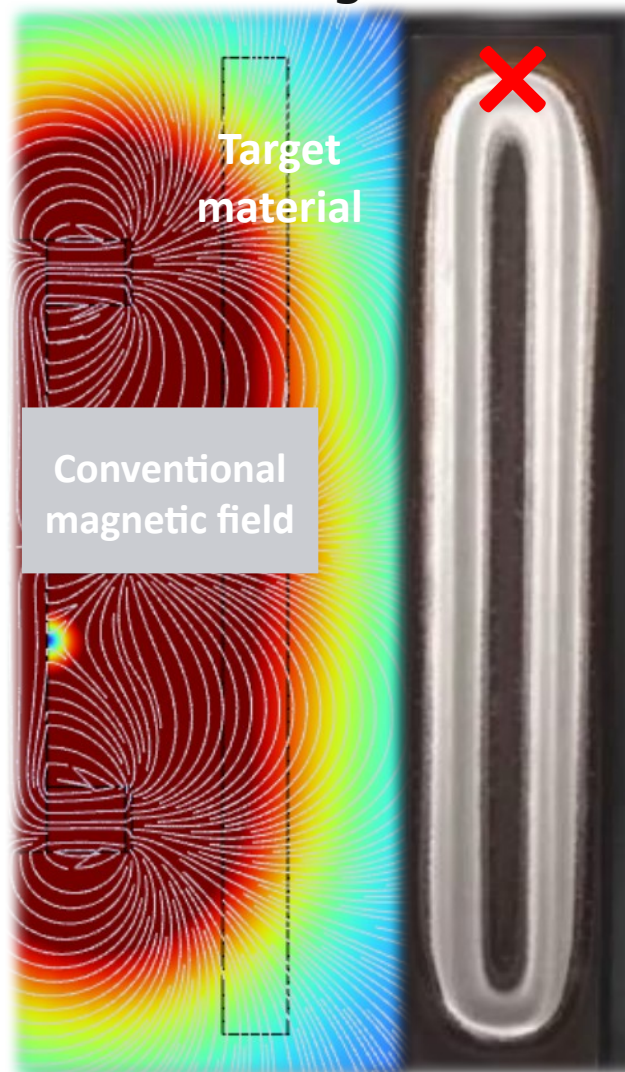
HUASHENG exclusive magnetic field design:

- Reduce the ion back absorption caused by the sheath in front of the target.
- The sputtering efficiency and the deposition rate are obviously improved.
- The sputtering area of that target material is obviously widened, and the utilization rate of the target material is improve.

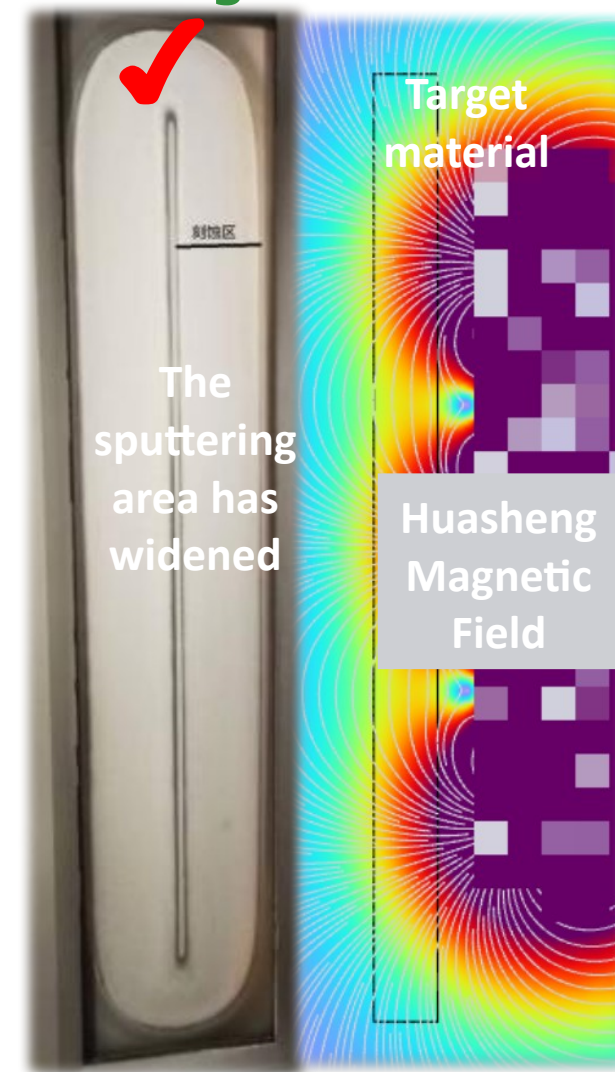


Sheath voltage - magnetic field strength

Conventional Sputtering Cathode Magnetic Field



Huasheng Cathode Magnetic Field



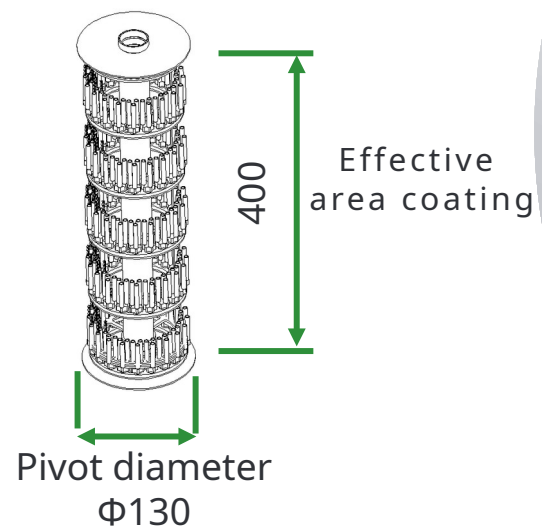
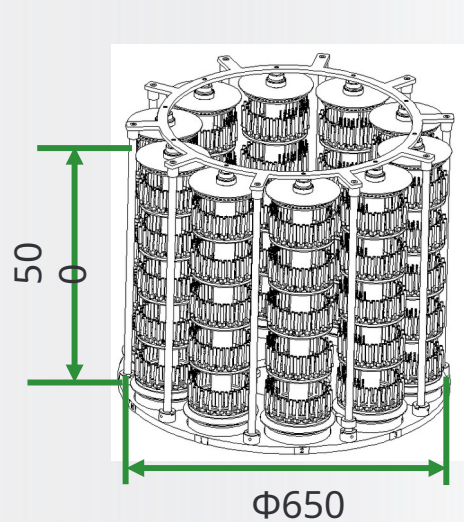
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TC800 PLUS-F Equipment Parameters

TC800 PLUS-F

Cycle time

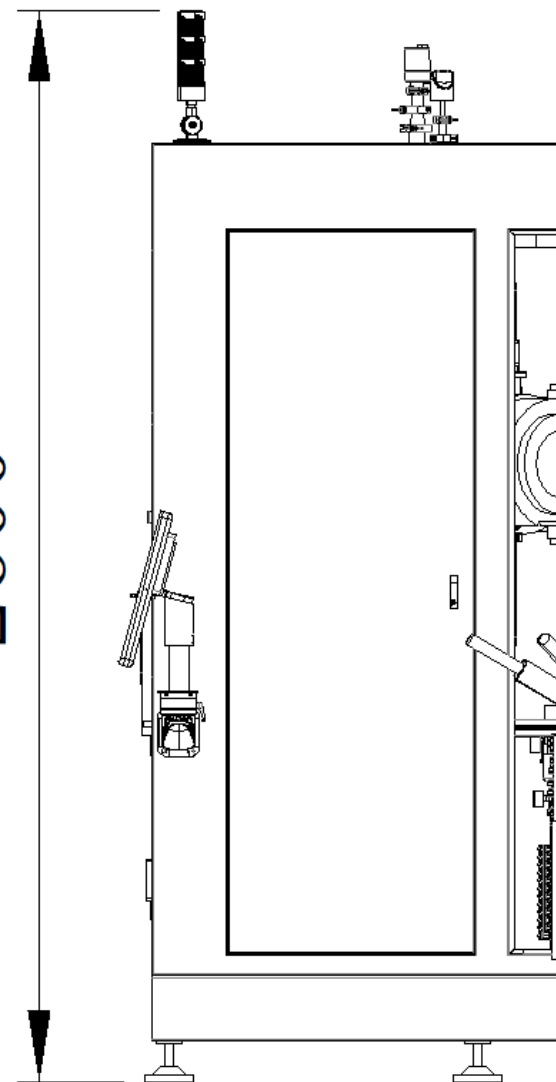
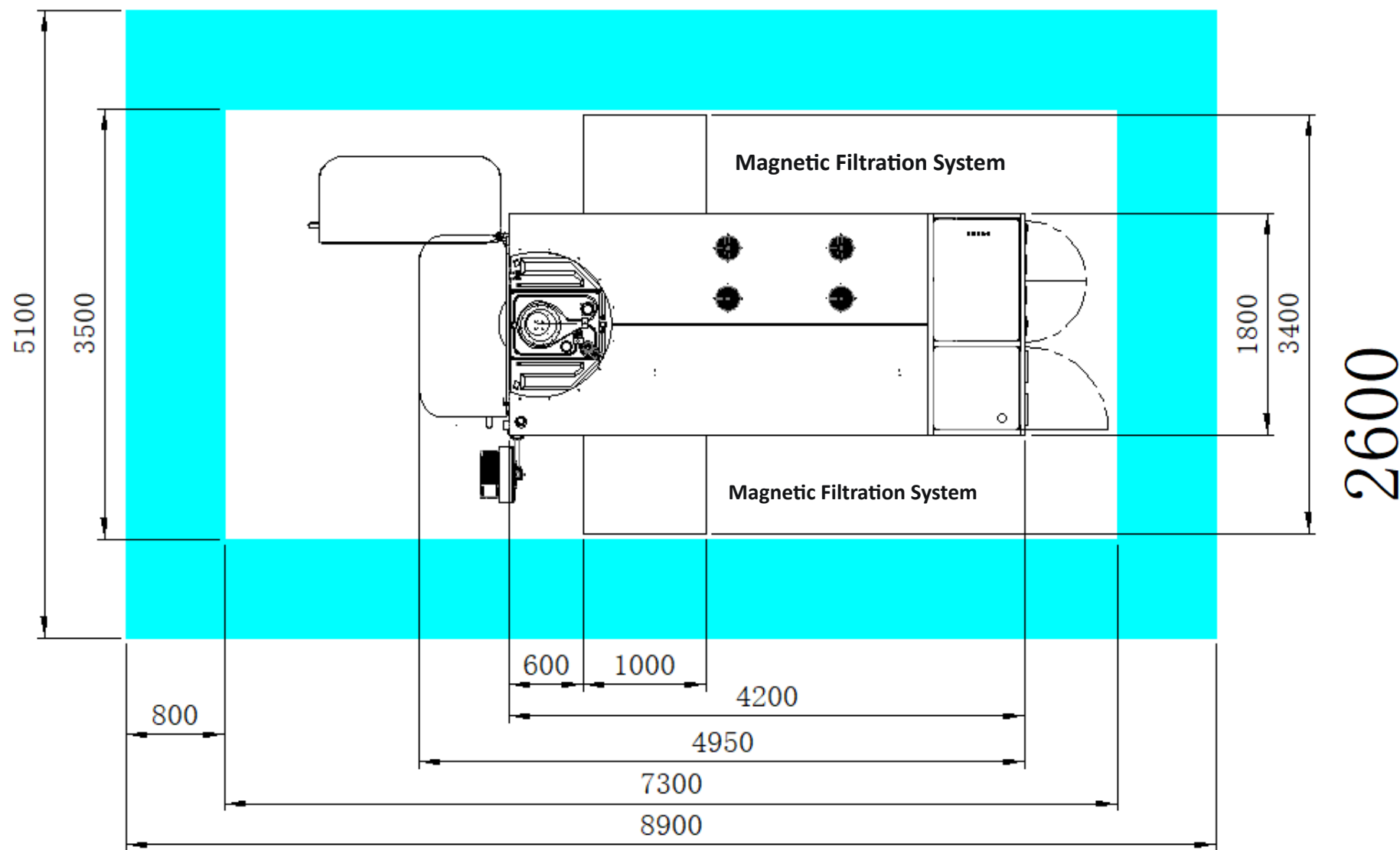
3~6h



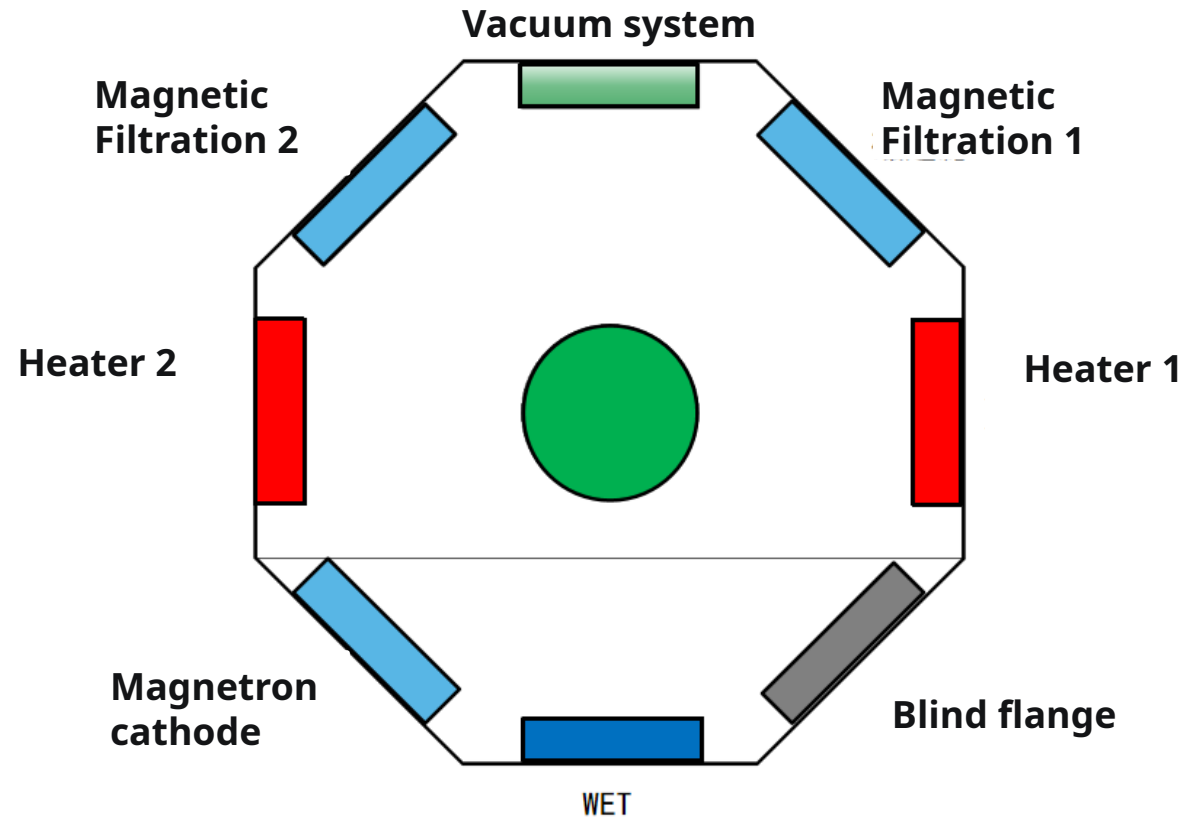
TC800 PLUS-F Equipment Parameters

Etching	Equipment size (mm)
WET Lateral Hot Filament Etching	Length 4950 × Width 3400 × Height 2600
End mill capacity (D4*50L)	Maximum working temperature (°C)
2400pcs	200
Maximum loading weight (kg)	Volume (m ³)
350	1
Effective coating area (mm)	Cycle time (h)
Φ650mm*400mm	3~6h

TC800 PLUS-F Dimensions



TC800 PLUS-F Equipment Layout



Component	TC800 PLUS-F
Ion Source	1 set
Number of Cathodes	2 * magnetic filtration + 1 * magnetron cathode
Cathode Arrangement	Staggered arrangement
Advantages	High cost performance, short production cycle

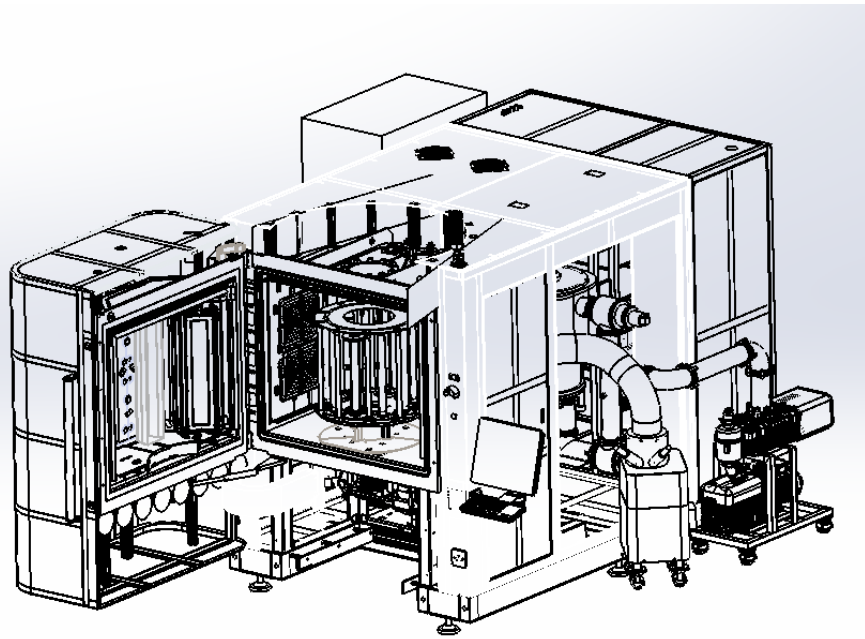
TC800 PLUS-F Equipment Electrical Specifications

Model	TC800 PLUS-F
Voltage	3*380/220V (3L+N+PE)
Current	3*76A
Power	50kW
Frequency	50/60Hz
Cooling water 22~26°C	5-5.5bar
Compressed air	5-6.5bar
Recipe gas : Ar	1.0-1.2bar

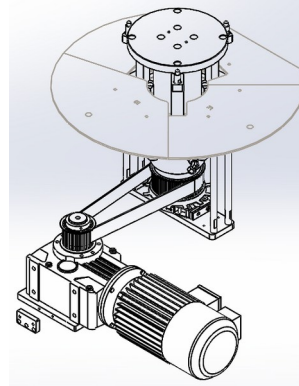
TC800 PLUS-F Equipment Consumption

Model	TC800 PLUS-F
Minimum Purity	(Ar) 99.992%
Consumption Per Batch	(Ar) 35L per batch
Cooling Water	Max Heat Discharge ~40kW Flow Rate 100 L/min (Ullage ~10 L per cycle)
Electric power supply	Average Power ~30kW/h ~2.5h per batch (subject to specific recipe)

Functional Components



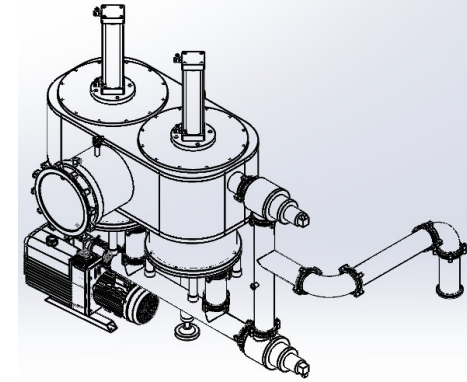
Device body



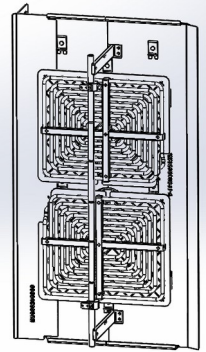
Bias Module



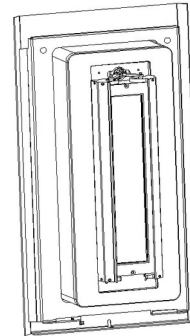
Etching Module



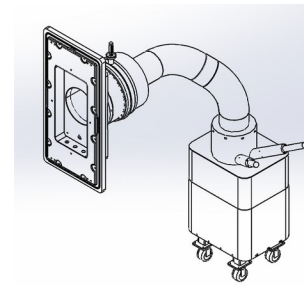
**Vacuum Pumping
Module**



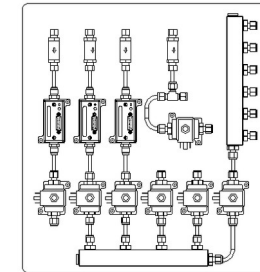
Heating Module



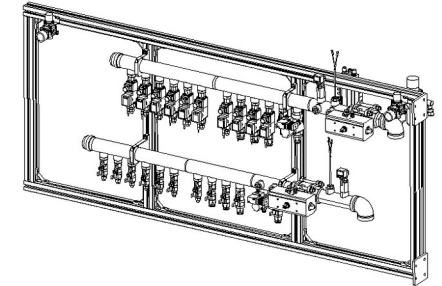
**Magnetron Cathode
Module**



**Magnetic Filtration
Module**



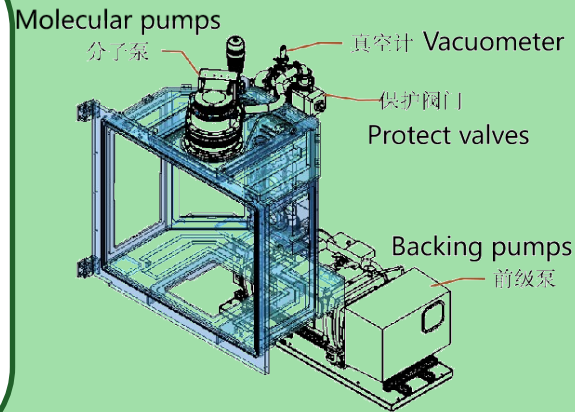
**Recipe Gas
Module**



Waterway module

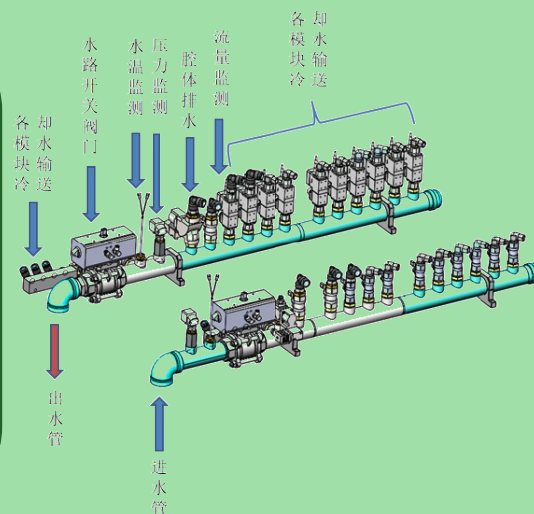
Components and Concepts

Vacuum system



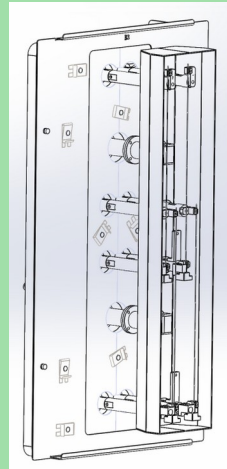
- Pump the vacuum chamber to required vacuum level for coating
- Can choose cavity pressure control mode or flow control mode
- Achieves precise control of gases

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

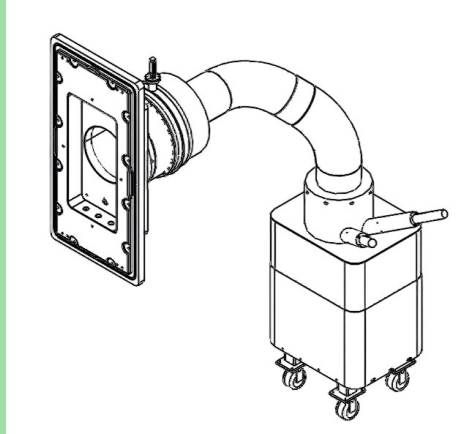
Ion Source Control System



- 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.

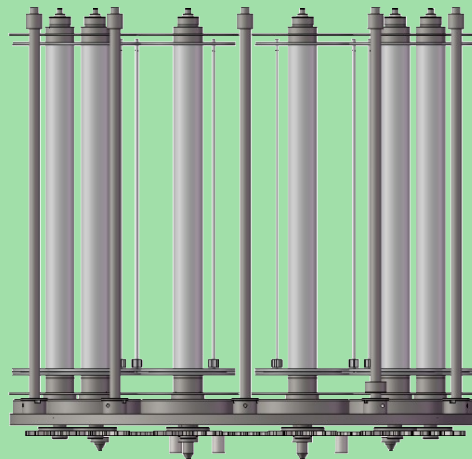
Components and Concepts

Magnetic Filtration System



- Ultra-hard and wear-resistant, hardness close to diamond; low friction coefficient, extremely low wear rate
- Ultra-clean and smooth: free of large particle defects
- Hydrogen-free and high temperature resistance: no hydrogen content, avoiding hydrogen embrittlement
- Strong adhesion and high compactness: high-energy ion implantation enhances film-substrate bonding, with high film density and corrosion resistance

Power transmission and turret



- Driven by variable frequency motor, continuously adjustable from 1 to 3 rpm
- Main shaft adopts magnetofluid seal
- The rotating rack realizes the revolution of the large plate and the rotation of each spindle through gear transmission

Bias Power Supply (HUASHENG)

- Constant voltage output, providing negative bias voltage for the workpiece rack
- Accelerates argon ions to bombard the workpiece surface during etching

- Enables more thorough workpiece cleaning and improves film adhesion
- Adjusts film properties by changing the value of negative bias voltage



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

Core Component List



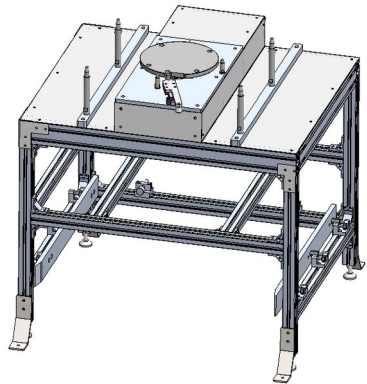
No.	Component Name	Quantity	Brand	Parameter Description
1	Molecular Pump	2	Leybold	Pumping speed 2200L·s-1, Ultimate pressure 3×10-8Pa
2	Foreline Pump	1	Leybold	SV220B+WAU501 (Rotary vane pump + Roots pump combination) Pumping speed: 500m³/h
3	Bias Power Supply	1	AE	Solvix, 30kW/set, pulsed DC, DC1000V
4	Magnetic Filtration Assembly	2	HUASHENG	Including power supply
5	Magnetron Cathode	1	HUASHENG	Target size L650*W100*T10mm
6	Magnetron Power Supply	1	HUASHENG	HSP7530, 30kW/set, pulsed DC, DC1000V
7	Ion Source	1	HUASHENG	WET lateral etching ion source
8	Temperature Control System	1	HUASHENG	Power/temperature two control modes, armored heater, total power 16kW

Core Component List

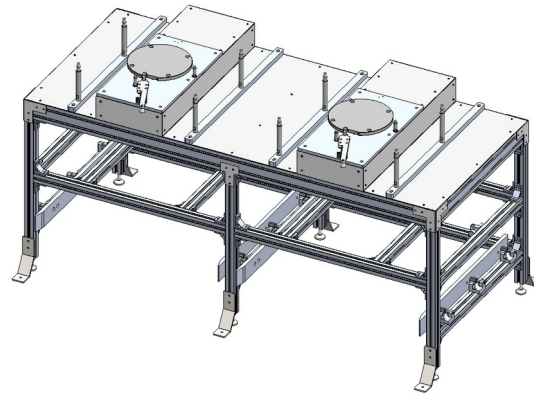
No.	Component Name	Quantity	Brand	Parameter Description
9	Flow Meter	1	Qi Xing	1L 1 set
10	Automation System	1	Huasheng	PLC, 19-inch touch screen
11	Chamber	1	Huasheng	304L stainless steel
12	Workpiece Transmission System	1	Huasheng	Variable frequency motor 0.5~3 rpm, load bearing 350KG, magnetofluid seal
13	Vacuum Measurement	1	INFICON	1 capacitance diaphragm gauge, 1 cold cathode vacuum gauge, 2 Pirani gauges
14	Pneumatic Control	1	SMC	Solenoid valves, cylinders, sensors
15	Cooling Water Control System	1	SMC/NNT	Water temperature, flow sensors, pressure sensors

Optional Accessories

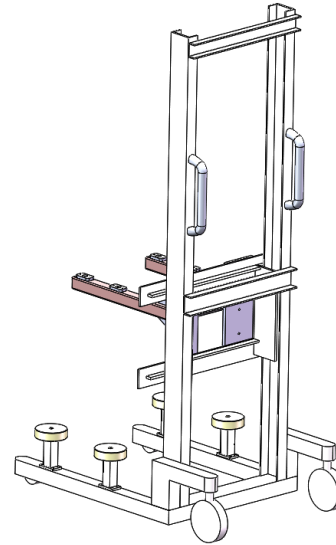
- Single-station Workbench



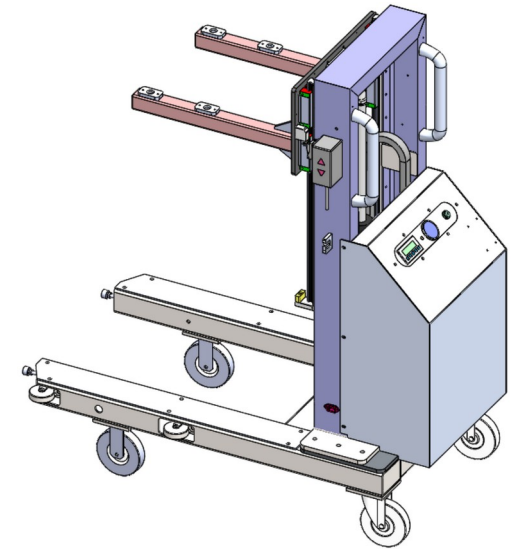
- Double-station Workbench



- Manual Furnace Loading/Unloading Forklift



- Semi-automatic Furnace Loading/Unloading Forklift



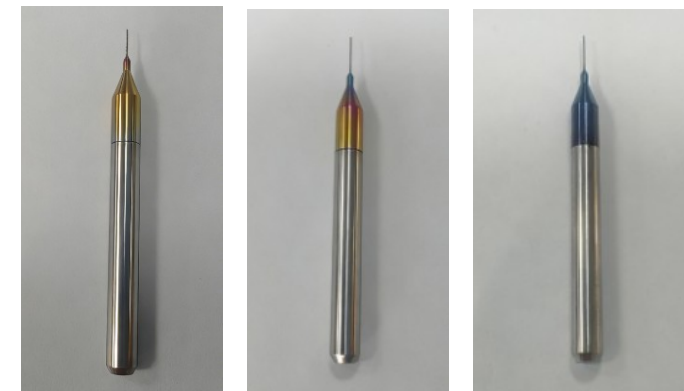
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TC800 PLUS-F Equipment Rceipe

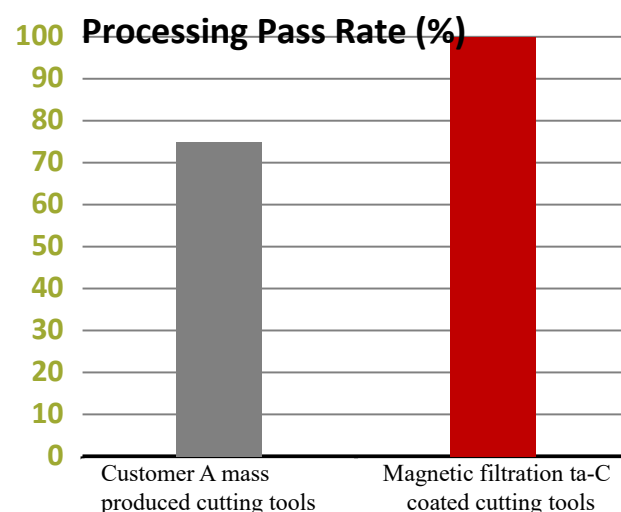
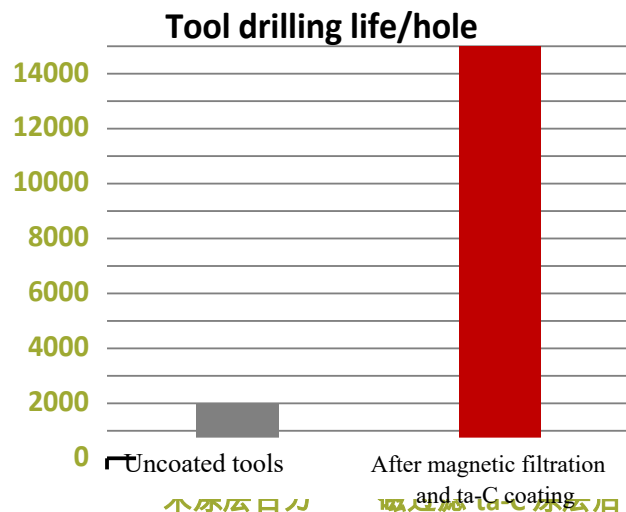
Coating Solution | Micro Drill



Coating	Huasheng ta-C
Coating Color	Colorful
Coating Thickness/ μm	0.1~0.5
Nano-Hardness/GPa	40-80
Residual Stress/GPa	-3 $\pm$ 1
Deposition Temp./ $^{\circ}\text{C}$	<100
Anti-Oxidation Temp./ $^{\circ}\text{C}$	450



- After Huasheng magnetic filtered ta-C coating, the processing life of the micro drill is increased from 2000 holes to 15000 holes
- The original processing qualification rate of the customer's tools was 75%, which is increased to 100% after magnetic filtered ta-C coating

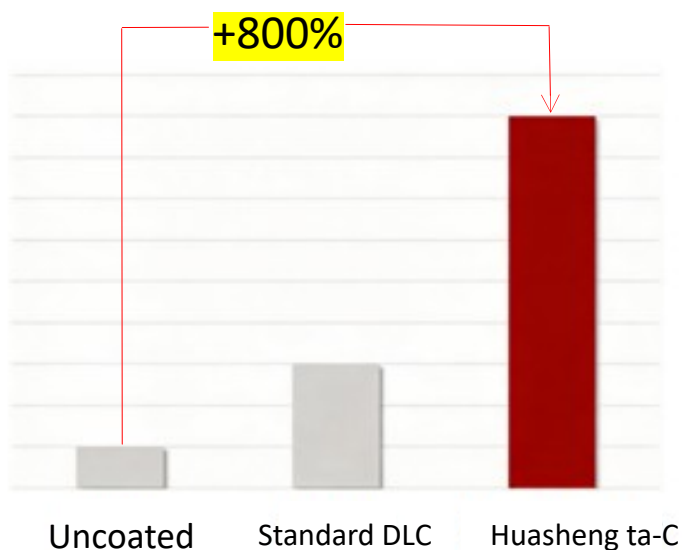


Coating Solution | Optical Lens Mold



Customer Challenges:

- Mold corrosion and adhesion
- Short mold service life



Lifespan Comparison

Coating	Huasheng ta-C
Thickness/ μm	0.1~0.2
Nano-Hardness/GPa	> 50
Deposition Temp./ $^{\circ}\text{C}$	<100
Anti-oxidation Temp./ $^{\circ}\text{C}$	450

- Ultra-low energy anti-adhesion: extremely low surface energy, fundamentally solving the sticking problem of glass/resin molds
- Ultra-hard and wear-resistant properties: ultra-high hardness to ensure die-casting service life
- Excellent thermal stability: stable structure at high temperature, no decomposition and no falling off

An ultra-hard ta-C coating is prepared on the mold surface, with low surface energy to reduce viscosity and friction. The service life of the mold after ta-C coating is 9 times that of the uncoated one. In addition, the coating contains no metal, and the mold can be easily demolded for repeated use.



Your Ideas, Our Solution

THANKS