

The Front Loading PVD coating machine is mainly used in metal furniture, products. can coat all kinds of metal material products as base material, adopting the world most advanced and pollution-free of surface treatment technology-vacuum coating process (PVD) in stainless steel surface coated with wear-resisting, resistance to abrasion, high temperature resistant also can have different colors of density board of the membrane of the compounds.

Our company equipment can be processing all kinds of colored products, color bright beautiful appearance, all show richly luxurious, good resistance to wear and abrasion resistant, high temperature resistant, such as performance, can durable, guarantee the normal color 20 years; Meanwhile, the technical process after the PVD stainless steel plate and the products, and fully keep the original surface, stainless steel, luster and strength, its physical, chemical, and mechanical properties or affect, which can be directly to conduct the follow-up processing, can effectively play stainless steel the green environmental protection metal all features.

The coating type: decorative coating(nitriding titanium coating and carbonization of titanium coating, nitriding zirconium film, titanium alloy film, chromium nitride coating etc), a metal, reaction film, and colorful coating,color series including: **all type PVD colors including gold, rose gold, brown, coffee, bronze, light black, rainbow color, deep wine color, champaign gold color, dark black color Etc.**

The machine also suitable for coating different shape products Like hotel interior products, components, hardware, kitchenware, kitchen sink and other construction products

2, Processes for each type of products:

For no stainless steel metal parts,

need do electroplating to get base coating on products,
then use machine to do PVD coating to get color coating
QC and Package

For stainless steel products, processes are (Small size products)

Use the ultra-sonic cleaning machine remove the oil and dust on products surface.
Put products into oven to dry the first step's water, keep surface dry.
Loading products on fixture, put inside PVD machine to get color coating.
QC and package

For stainless steel sheet, processes are:

Clean sheet keep surface no water no dust no oil(if customer have high requirement, we can supply the Ultra-sonic cleaning line for cleaning sheets also, if normal coating quality, customer can manual clean sheets by red powder)
Loading inside PVD machine to get color coating
QC and plastic Lamintor

For stainless steel pipes, processes are:

1, if customer stainless steel pipe inner have dust and oil, Must use ultra-sonic cleaning machine to clean inner also. If clean inside, only use Red powder clean outside is OK.

2, load inside the machine and get colorful coating

For stainless steel accessories, Need check to see what exact product, some shape products can use manual cleaning, some must use ultra-sonic machine to clean.

After cleaning, put inside oven to dry

Loading inside the machine and get coating color.

For glass products

Ultra-sonic cleaning to remove dust and oil on products surface first

Use oven to dry glass products keep it is no water

Loading products

Put inside the PVD coating machine to get all kind of colorful coating

Unloading products

For ceramic products

Clean ceramic first to keep surface no dust no oil no wax

Put ceramic inside oven to keep 260 centidegree for 2 hour

Loading ceramic on the machine to get coating

3. Customer should prepare:

3.1 3.1.1 **Required Floor Space: Length7850mm*Width6000mmxHeight3742mm.** This size

not including, ultra-sonic cleaning, drying, turnover and Quality control room.

3.1.2 Temperature and Humidity: Temperature 20°C and Humidity 70%

Temperature 25°C and Humidity 60%

Temperature 30°C and Humidity 40%

Temperature 35°C and Humidity 40%

3.1.3 Required environments: Equipment surrounding environment clean and tidy, clean air, should not have caused electrical and metal parts, the surface corrosion or cause between metal conductive dust, strong magnetic field or the presence of a gas.

3.2 Water cooling system(including 30Ton/H water cooling tower)

- temperature (inlet): 20.25°C
- pressure (inlet), *static and dynamic*: 6 bar abs.

Required pressure difference between Inlet

- and outlet: > 3.5 bar
- pH value: 7.5.8.5
- conductivity: < 600 µS/cm
- bicarbonate hardness: < 150 mg/l
- sulphates: < 150 mg/l
- chlorides: < 100 mg/l
- ammonia: < 2 mg/l
- iron: < 0.2 mg/l
- nitrates: < 50 mg/l
- suspended solids: < 10 mg/l
- particle size: < 100 µm
- plate count: < 1000 ¹/ml

PLEASE NOTE: These values apply to a water temperature of 20.25°C

Consumption: 2800 l/hour

Compressed air Pressure min./max.: 6 - 7 bar

Consumption: 300 l/batch

Ambient conditions:

To avoid condensation on water-cooled surfaces, particularly water-cooled power supplies, diffusion pumps etc., the humidity values listed below should not be exceeded.

Cooling water temperature: min. 20°C

Ambient temperature (max.):	20°C,	acceptable rel. humidity (max.): 70%
	25°C,	60%
	30°C	40%
	35°C	40%

PLEASE NOTE:

Best production conditions differ from above values. We recommend ambient temperatures of approx. 20°C and a relative humidity of < 55%

3.3. Coating gas

Supply high purity gas: Argon, Nitrogen, Oxygen, Acetylene. 0.01Mpa supply (to be prepared by customer)

Ar: 0.15~0.3MPa, purity: $\geq 99.9\%$ N₂: 0.15~

0.3 MPa, purity: $\geq 99.9\%$ C₂H₂: 0.15~0.3 MPa

, purity: $\geq 99.5\%$

O₂: 0.15~0.3 MPa, purity: $\geq 95.2\%$

3.4. Air system

Supply of compressed air 5-8KG pressure.10HP air compressor (to be prepared by customer)
Including Air compressor+Air filter(remove dust,oil,and water)+Air dryer+Gas store Tank system.

3.5 Electricity system

Power Consumption:

Machine in full loading :250KVA

(all parts works at the same time, But in real production only some parts of the machine works at same time)

Average Power Consumption : Approx. 85KW/H, 3- phases, 5-wires

The machine also requires a 250 KVA transformer (to be prepared by customer)

3.6 Equipments for Quality control:

(Factors influence coating quality:Material, base electroplating,cleaning,drying,fixture type)

Color tester(L.A.B number)

Abrasion tester

Thickness tester

Salt Spraying tester

3.7. Machine import HS code: 8543300090

3.8 Maintenance :

Diffusion pump oil: Change every 12 months. But need add the oil when it consume.

Mechanical pump & Holding Pump : Change oil after first month operation, thereafter, change oil every 3 months

Roots Pump Oil : change once a year.

In normal condition chamber need be clean and maintenance when running 200 cycle for Zr/Cr colors.

Specially: From deep color series to light color series must clean chamber, target, stainless steel innersheets and empty loading 2-4 cycles.

3.9. Consumables and Parts (color series which can be got by PVD machine)

Raw material :

Titanium target 99.7% purity (For all type PVD colors including gold, rose gold, brown, coffee, bronze, light black, rainbow color)

Zirconium target: 99.7% purity (For getting champaign gold color)

Titanium aluminium alloy target (For getting deep wine color)

Chrome target: 99.7% purity (For getting Dark Black color)

Arc target: Diameter 95mm x Thickness 45mm x 1.5 thread.

3.10 Staffing:

Although we design the machine as fully automatic control system and can achieve non-man control, but one experienced engineer is necessary for the project. The engineer need know each part of the PVD machine, know how to control the PVD machine and know whole process including cleaning, drying, and coating technology. If customer factory already experienced in PVD, we can train until your staffs know how to coat. If customer is first time been in PVD field, we will suggest one experienced engineer from China work in customer's factory 2-3 months to training and Supervise whole production until customers can fully control whole project. This experienced engineer was recommend by HUICHENG VACUUM based their experience in this field. Customer need pay salary and accommodation to the engineer.

3.11 Update in the future:

Based Experienced in past years, HUICHENG always consider full information for customers when design one new project for customers. For PVD stainless steel sheet machine, we will reserved function can update new cathode arc if there is new technology

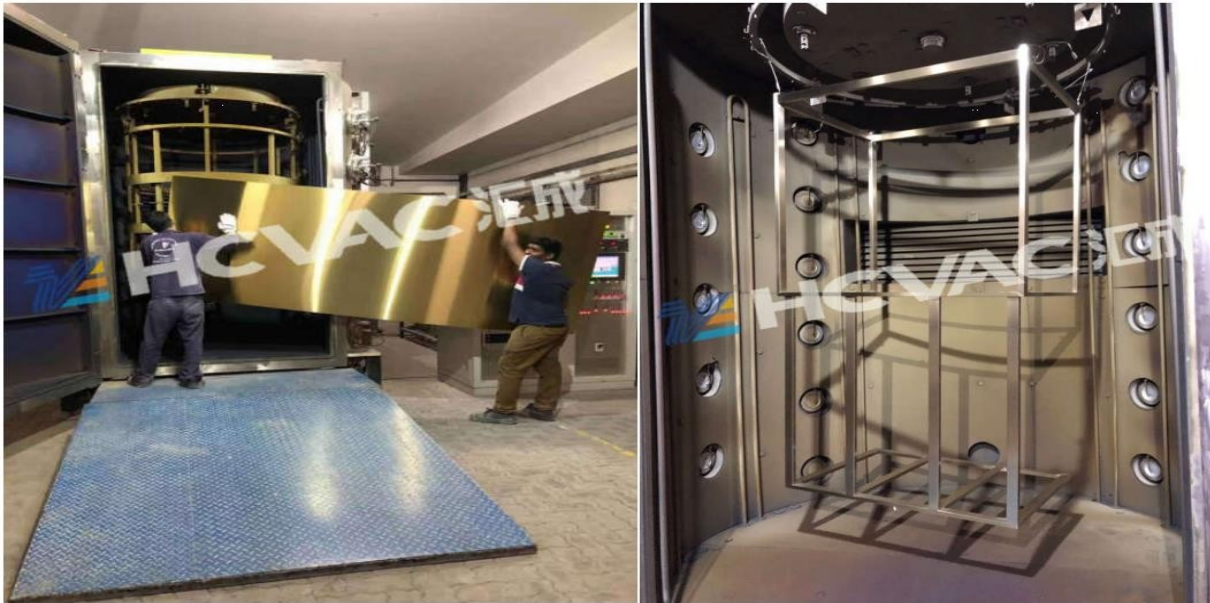
Why HCVAC PVD machine for furniture products:

- 1, Experienced in last 22 years for designing and manufacturing PVD machines and have more than 3200 sets PVD machines running in 50 countries in the world.
2. HCVAC already provide the whole surface treatment Solution (A-Z) for world famous lighting products, HCVAC not only manufacture a PVD machine but also Provide Whole coating technology solution for our customer, we are keeping study ourself for new color series and update information for our customers.
3. Whole engineer team and After-sell service team can support our customers start from zero until customer fully experienced in PVD field
4. advanced vacuum coating technology, perfect system design provides products with strict production environment.

5. Any rough coating artifacts will be a very advanced precision instruments detect.
6. Each coating system can achieve the lowest cost, the most widely used.
7. Fully automatic computer control, closed-circuit circulation process control, make the system more secure, easier to grasp customers.
8. CE certification of computer automatic control vacuum ion coating machine

Technical book

HCCA-2335 Vacuum Coating Machine





Technical data:**1、 Vacuum chamber:**

- 1-1 Dimension: Diameter×Height $\Phi 2300 \text{ mm} \times H3500 \text{ mm}$ vertical single door.
- 1-2 Open front door/Two observer windows in the front door
- 1-3 The main body material of the chamber is jointing with stainless steel SUS304, and high temperature annealing to eliminating the stress of the material, to promise no deformaiton in the long use period. Inner chamber thickness is 16MM,outer use stiffiener, Only can keep machine chamber many years not change shape.

2、 Pump performance

- 2-1 Ultimate vacuum: $8.0 \times 10^{-4} \text{ Pa}$.
- 2-2 Pumping time: atmosphere to $7.0 \times 10^{-2} \text{ Pa} \leq 10 \text{ min}$ (Emputy loading)
- 2-3 Pressure rising rate (keep pressure: 0.67 Pa/hr).
- 2-4 Highest temperature: 300°C

3、 Movement mode of jig shelf

- 3-1** Bottom rotary stand. 3/6 axes. For furniture parts3-
- 2 1 set (2nos)fixture for stainless steel sheet
- 3-3 Public rotation rate: $0 \sim 3$ cycles per minute,transducer controls the AC three-phase motor.

4、 Total power of the machine

Total power is about 300KVA (three phase four wires+ground wire) ,auxiliary equipment provided by the user.

5、 The auxiliary equipment provided by the user

- 5-1 Supply the cooling water $18 \sim 25^\circ \text{C}$, flux 800 L/min , Pressure $0.25 \sim 0.35 \text{ MPa}$.
- 5-2 Compressed air, pressure $0.6 \sim 0.8 \text{ MPa}$.
- 5-3 High pure gas,Ar,N₂,etc.Decompress the gas to 0.01 MPa before supplying.

6、 The weight

The total weight is around 16.5 tons.

7. The application of the machine:

The coating machine is used to coat decorative film and function film, especially coat the metal film, namely the term ceramic, metal and watches industry. It integrated the technology of arc source evaporation. The coating film is corrosion resistance, wearable, good combination between the film and substrate, etc. It is widely used in the, ceramic tiles, ceramic tableware, jewelry, hardware, stainless steel, tableware, and so on.

8. The characteristics of the main pump:

Rough pump:

Name: **2X-70B rotary vane vacuum pump**

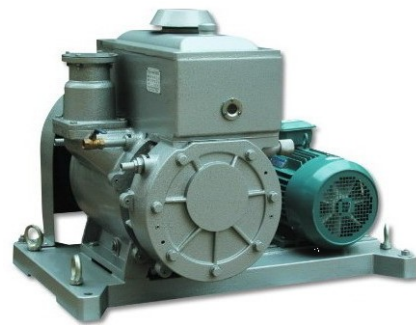
Pumping rate: 70L/s

Motor Power: 5.5kw

Number: 6 sets

Features:

1. It can start from the atmospheric pressure directly.
2. It can be use as low vacuum pump separately, also used as backing pump by combined with other high vacuum pump.
3. The series are widely used in the metallurgy, chemistry and light industry, pharmacy, electricity and semi-conductor industry.
4. This pump is not suitable for pumping the gas as following: poisonous, explosive, high oxide, easy to reactive with pump oil, corroding the black metal. And it can't be used as compressor and transfer pump.



2X-30 two sets.

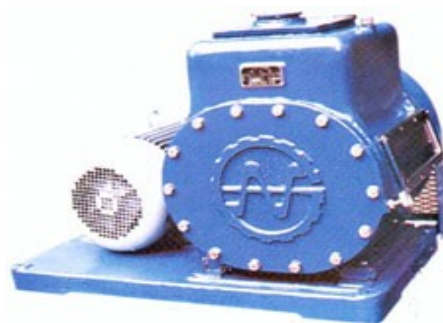
Pumping rate: 30L/S

Motor power: 3kw

Quantity: 2 sets

Characristics:

1. It can pump directly from the atmosphere;
2. It can be used as low vacuum pump single, also can be used as backing pump while combined with other high vacuum pump.
3. The series products are widely used in metallurgy, chemical industry and light industry, medicine, electron and semiconductor industry.



4. The pump can't be used to pump the gas with high oxygen,poisonous,explosive,acting with pump oil,or corrupt the black metal.It can't be used as compressor or transmission pump.

Booster pump

Name: **RTO-1200 Roots pump**

Pumping Rate: 1200L/s

Motor Power: 7.5kw

Number: 2 sets

Characristics: RTO series inner cooling type overload protecting Roots vacuum

The pump includes four core techniques:

- 1、End cover water direct cooling technique
- 2、Inner type gas pre-releasing technique
- 3、Wind cool enhanced technique
- 4、Dynamic seal cover reuse technology.



Diffusion pump

Name: **KT-800 oil diffusion pump**

Pumping rate: 30000L/s

Motor power: 11kw

Numbers: 2 sets

Characteristics:

1. The pump has no mechanical movement part,and it is not restricted by the friction,lubricate, vibration,etc.Therefore it can be made into the pump with high work,long using life.So long as choosing the proper structure mate eliminating the corrosive gas,impurity gas and steam.
2. It has simple structure,light weight,small occupation.
3. The working steam pressure is $4\sim 9\times 10^{-5}\text{Pa}$, and it can be found in the usual Metallurgy Industry,chemistry industry,pharmaceutics and other corporations.



9.Main configuration:

Ser No.	Name	Specification	Qty	Unit	Remark
1	Vacuum unit	2X-70B rotary vane vacuum pump	6	set	
		2X-30 holding pump	2	set	
		RTO-1200 Roots pump	2	set	
		KT-800 diffusion pump	2	set	
2	Vacuum Furnace	Vacuum chamber: D2300mm*H3500mm, the inside and outside of the vacuum furnace are made in stainless steel material, double water cooling, spray-paint in the surface, one set of rotation shelf, one set of heater, down rotation shelf ,two observe windows. The vacuum chamber has 32 arc target flanges, two sets of stainless steel scale boards in the inner surface for the cleaning and replacement in future.we use SS304 scaleboard with 0.8MM thick 2 sets	full	set	
3	Valve pipeline	The material of the pipeline is stainless steel; the material of the vacuum valve is carbon steel.	full	set	
4	Heating system	Use 9 piece infrared heat single pipes with power 7KW,the total power is 63KW, the left of the right each has a thermocouple, U type heat pipeline.	full	set	

		Heating from normal temperature to above 300 centi-degree.			
5	Work piece rotation system	1. Bottom down rotary stand which suitable for coating sheet and components 2. Biggest components size can be loaded by this machine: Diameter1600*Height3000mm	1	set	
6	Measurement controller	Use the ZDF-X-LED composite pressure measurement instrument, matched automatic transform from low vacuum to high vacuum.	full	set	
7	Coating System	Matched 32 pieces Ti ϕ targets with stainless steel in the base, indirect water cooling.(double flange)	32	set	
8	Gas quality Flow instrument	Ar:1000sccm oxygen:2000sccm,acetylene: 2000sccm Nitrogen 3000sccm., plus one set of electromagnetism stop valve, one set of gas mix jar.	4	set	Seven star
9	Electric control system	1. Our company with independent intellectual property rights of coating machine automatic control system can complete set equipment process and collect and record the data of each operation 2. 15 inch kunlun state industrial computer control center, Mitsubishi PLC automatic control and coating process, transfer among all adopt the relay. 3. The operating system has flexible visual operation interface, and according to the specific situation of the equipment operation, can be divided into	full	set	

		<p>manual interface, automatic maintenance interface, interface.Independent of manual operating system, can be arbitrary switching and automatic system.</p> <p>4. Real-time data acquisition, and hard disk of the input, so that after the analysis and improvement process.It can display data curves.</p> <p>5. Set the process flow and execution, execution process parameters and different time periods can control 4 road gas flow.</p> <p>6. Independent multi-channel cooling water flow rate digital embedded real-time monitoring system, the flow sensor to detect various sputtering target and other important components of the cooling water flow rate conditions, alarm and record.</p> <p>7. the vacuum interlock protection and valve protection vacuum conditions.</p> <p>8. Urgent stop switch assembly, once a major anomalies by touch the stop switch device, switch is equipped with shielding, avoid the wrong operation.</p> <p>9. Electric control system of pump drive contactor, empty adopt schneider products, equipment general contactor power and heating system, air is using chint products.</p> <p>10. Auto and manual operation through PLC but in case of failure of PLC ; manual operation will be separate.</p>			
10	Power Source	DC inversion 200 arc power source	32	sets	Beijing jianing
		Bias power supply 60KW	1	sets	BiaoXian

11	Protective Function	The equipment has the function of hydraulic pressure loss, gas pressure loss, automatic alarm and interlock.	full	set	
12	Accessories	Introduction book, electric power circuit diagram.	1	set	
		4 pieces Glass vacuum gauge tube			
		2 metal glass vacuum gauge tube			
		1 set of chamber and Pump O-ring rubber			
		2 bottles vacuum grease			
13	Aerodynamic system	Dry, oil-free compressed pneumatic source, required pressure: 0.4MPa~0.6Mpa.	Provided by the customer		
14	Cold water distribution system	Required cold water supply: water pressure 0.2~0.3Mpa, the temperature coming into the machine 20~25℃, flow rate 50L/min			
15	Gas source	Ar: 0.15~0.3MPa, purity: ≥99.9% N2: 0.15~0.3 MPa, purity:≥99.9% C2H2: 0.15~0.3 MPa, purity:≥99.5% O2: 0.15~0.3 MPa, purity:≥95.2%			

IV: Safety design




1. Purpose: can fully guarantee the operator far from dangerous threaten
2. The key: security work, pay attention to all kinds of warning
3. Means: the key parts of the test switch, software auto-interlock design; EMO switch, the danger signs everywhere







Tools: We will provide safety manual, safety training

V: Environmental protection standard

Dongguan huicheng vacuum technology co.,ltd strictly carry out < Pests void instructions > instructions, the harmful material in the meet the ROHS requirements: mercury (Hg), cadmium (Cd) and lead (Pd), hexavalent chromium (CR6 +), Equipment no any harmful during the production for worker and the environment

PVD-ACCESSORIES for HCCA-2335 PVD Coating Machine 300x3500

Oven	Oven for baking components, width2m*height2m*length3.5m.	
Water tower	30T, supply cold water for machine(Support machine for PVD machine)	
Air compressor	10P,for making air pressure(Support machine for PVD machine)	
Drier+Filters	10HP,for dry the air which inject the machine,remove humidity(Support machine for PVD machine)	
Gas store tank	D800*1700mm, for storing compressed air(Support machine for PVD machine)	
Metal vacuum sensor	measure the high vacuum degree, ZJ-52(maintenance material for 2 year),20 pcs	
Glass vacuum sensor	measure the low vacuum degree, ZJ-27(maintenance material for 2 year) 20pieces	
Titanium target	99.9% purity(raw material) Diameter95*thickness45*1.5, 96pieces,enough for 1 year use. for basic color series	
Zirconium target	99.9% purity(raw material) Diameter95*thickness45*1.5, 32 pieces, for getting shinning gold,champagne color	

Chrome targets	99.9% purity(raw material) Diameter95*thickness45*1.5, 32 pieces, for getting white chrome or dark black color	
Diffusion pump oil	4L/barrel (maintenance material for 1 year). 20 Bottles for 1.5 years use	
Roots pump oil	18L/barrel (maintenance material for 1 year), 20 bottles for 1.5 years use	
plastic lamintor machine	for protecting pvd coating on sheet, can adhesion one plastic layer, for sheet width1600mm	
Insulating case	Maintence parts for arc target,20 pieces	
target 5 different size oring	Maintence parts for arc target,10 sets	
nelfon case	Maintence parts for arc target,50 pieces	
cermic parts	Maintence parts for arc target 1set 2pieces,50 set	
coil arc rod arc springc valce seat aluminum case samll teflon	Maintence parts for arc target. 5sets	