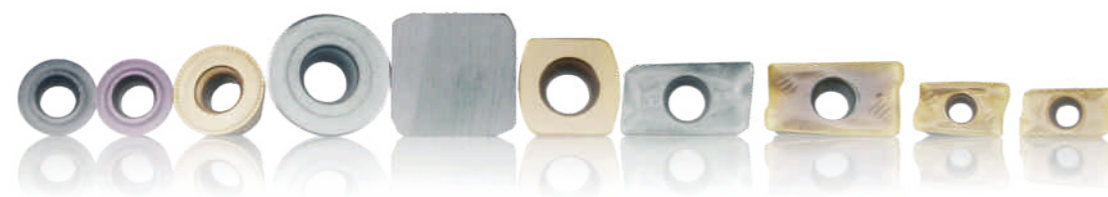


Creating Technologies Inc. Nano



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 Creating Nano Technologies Inc.



PVD & DLC

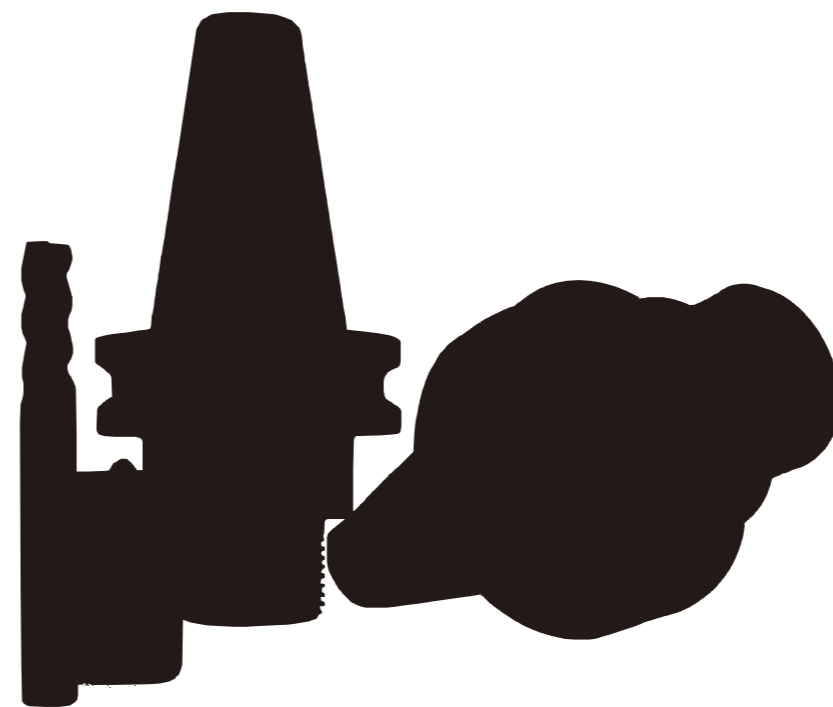
Series Coating Equipment

Creating
Technologies Inc. **Nano**



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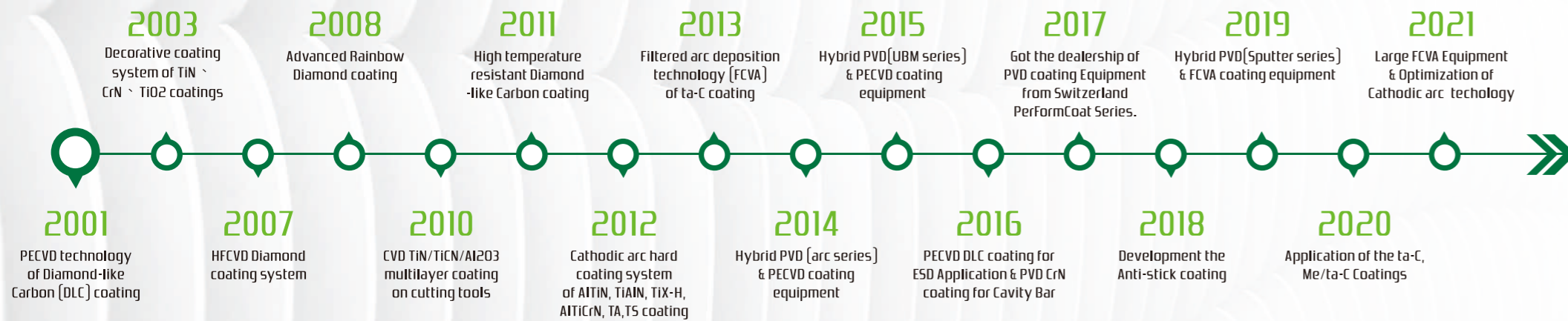


PVD & DLC
Series Coating Equipment

Creating Nano

Technologies Inc.

For more than 20 years



COATING TECHNOLOGIES

CVD technologies

1. Thermal CVD
 - 3D process for complex geometries and difficult to reach surface
 - Industry standard system
 - Low stress for 10~25 μm thickness
2. Hot filament CVD
 - Superhard diamond coating
 - 5~20 μm thick multilayer
 - Good adhesion
 - End mills for non-metallic materials (graphite, ceramic, composites, glass fiber, carbon fiber)

Sputter technologies

1. Magnetron sputtering (BM)
 - Model : BM1250
2. Unbalanced magnetron sputtering (UBM)
 - Smooth surfaces
 - Good adhesion, low internal stress
 - Low temperature process
 - Decorative coating

PECVD technologies

- Plasma enhanced chemical vapor deposition technologies
1. DLC Coating
 2. Rainbow Diamond Coating
 - Excellent coatings uniformity for 3D geometry components
 - Extremely smooth surface
 - Hard and scratch resistant
 - Resistant to chemicals and corrosion

Hybrid PVD & PECVD Equipment

1. PVD (arc) & PECVD (DLC) technologies
2. PVD (UBM) & PECVD (DLC) technologies
 - Model : Hybrid500 ; Hybrid650
 - The most flexible coating system
 - Ideal coating system for specialised coating or launch of new products
 - Available for nitride based and DLC coatings
 - Application for cutting tools, mold, mechanical components, decoration

Cathodic arc technologies

1. Circular cathodic source system
 - Model : PVN500-C8 ; PVN650-C12
2. Rectangular cathodic source system
 - Model : PVN500-R4 ; PVN650-R4
 - High pulsed arc model : Performcoat S800 ; S1000
 - Excellent adhesion
 - High hardness
 - Smooth surfaces with a few droplets
 - High capacities
3. Filtered arc technologies
 - Model : FCVA100
 - Specialized for ta-C coatings
 - Extremely high hardness, 40~60 GPa
 - Smooth surface and low coefficient of friction for lubricated applications
 - Optimized thickness from 0.1~1 μm

PVD Hard Coating Equipment

--- PVN Series ---

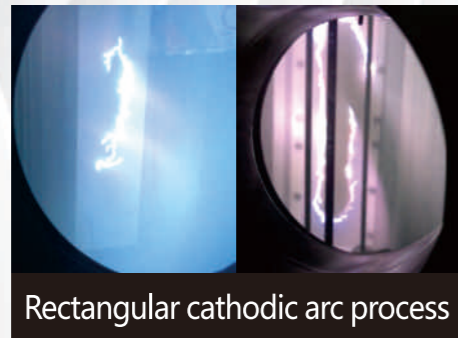
Features

PVN series hard coating equipment with Cathodic Arc Deposition technology provides the best tribological coatings to enhance the performance of cutting & forming tools, molds, mechanical components and other products.

It is a economical coating equipment for industrial production. In addition to excellent coating properties and high process reliability, it has high loading capacity to reduce cost per piece. If our standard models do not meet the production needs you want, we can customize a unique model for you.



Circular cathodic arc process



Rectangular cathodic arc process



Technical data of PVN Series Coating Equipment

Model	PVN500-C	PVN650-C	PVN500-R	PVN650-R
Technologies	PVD Cathodic arc technologies			
Foot print(mm)	W 1900 D 4000 H 2100	W 1900 D 4800 H 2600	W 1900 D 4000 H 2100	W 1900 D 4300 H 2600
Internal chamber size(mm)	Ø850 x 950	Ø850 x 1200	Ø850 x 950	Ø850 x 1200
Max. load(kg)	500			
Usable plasma volume(mm)	Ø480 x 550	Ø480 x 750	Ø480 x 550	Ø480 x 750
Spindles(mm)xPCS	Ø125 x 650 x 8	Ø125 x 850 x 8	Ø125 x 650 x 8	Ø125 x 850 x 8
Cathodic arc source	Circular	Circular	Rectangular	Rectangular
Cathode amount	4 or 8	6 or 12	2 or 4	2 or 4
Standard Bias power	DC 20kW/Pulsed (optional) Max. Inserts – DC 40kW			
Chamber	Stainless steel chamber with double walled jacket cooling			
Heater(kW)	32	40	32	40
Cycle time for 2~3µm (AlTiN)	5~6.5 hr (depend on production conditions)			
Shank tools capacity Ø6 x 50mm	2400	3840	2400	3840
Inserts capacity D10 x 4mm	2640 (5280)	3960 (7920)	2640 (5280)	3960 (7920)
Hobs capacity Ø80 x 180 mm	32	40	32	40
Electrical connection	3Φ+Ground 380V , 150A	3Φ+Ground 380V , 175A	3Φ+Ground 380V , 150A	3Φ+Ground 380V , 175A

Technical data of Hybrid Coating Equipment

Features

Hybrid series DLC coating equipment with latest Hybrid PVD-PECVD technology provides various diamond-like carbon coating processes for all kinds of application. Besides typical amorphous hydrogenated carbon (a-C:H) coating, we also supply advanced metal-containing DLC (Me/DLC) coating with outstanding adhesion strength and higher wear resistance.

Thanks to the excellent properties (high hardness, low friction coefficient, smooth surface, chemical inertness, good biological compatibility) of DLC coating, it is widely used for cutting tools, molds, automotive components, decorative coating and medical device.



PECVD process of DLC

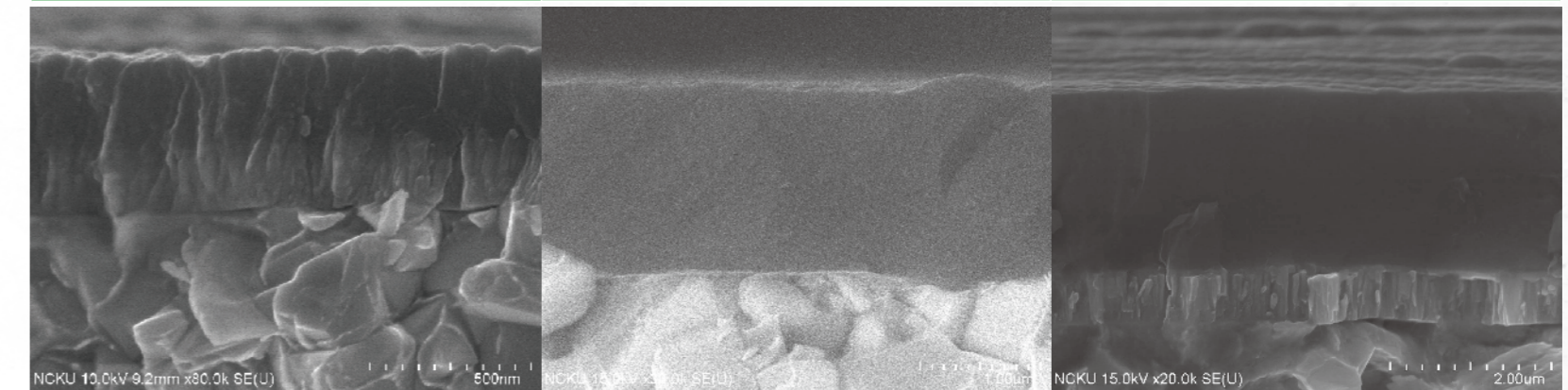


UBM Sputter process

Hybrid system
Me/DLC

Technical data of Hybrid Coating Equipment

Model	Hybrid500-4S	Hybrid500-4A2S
Technology	UBM+PECVD	Sputter+Arc+PECVD
Coatings	TiN,AlCrN,WCC,Me/DLC	TiN,AlCrN,Me/DLC
Foot print(mm)	W 2200 D 4320 H 3000	W 2200 D 4150 H 2360
Internal chamber size(mm)	Ø850 x 950	
Max. load(kg)	500	
Usable plasma volume(mm)	Ø640 x 350	Ø580 x 500
Spindles(mm)	Ø140 x 650 x 10	Ø140 x 650 x 10
Target source	Rectangular	Sputter : Rectangular Arc : Circular
Cathode amount	4	Sputter : 2 Arc : 4
Chamber	Stainless steel chamber with double walled jacket cooling	
Heater(kW)	16	16
Electrical connection	3Φ+Ground 380V , 200A	3Φ+Ground 380V , 150A



SEM image of various DLC coatings, including DLC Me-DLC(Left),(Middle) and Me/DLC (Right)

ESD-DLC

Electrostatic Discharge Diamond-Like Carbon Coating

Feature of coating

- Resistance value: $10^5 \sim 10^8 \Omega$.
- High hardness: pencil hardness >9H (HV1800~2200).
- The friction coefficient is small, wear resistance, and the lifetime can be more than 5 times.
(package test fixture).
- Good corrosion resistance.
- Low temperature (-50°C)/high temperature (200°C) will not peel off and the resistance value remains stable
- The coating is smooth and non-sticky.

Applied materials

Material is conductive material

- Stainless steel
- HSS (ASP23)
- SKD11、61
- FDAC (+Cr plating)
- Tungsten carbide
- Blue steel (+Cr plating)
- Aluminum alloy

⋮

Material is non-conducting material

- Aluminum alloy (6 series)
+ hard anode
- Ceramics (only plane)
- Engineering plastics
(PEEK, only plane)
- Glass fiber (only plane)

ESD-DLC technologies



Rainbow Diamond

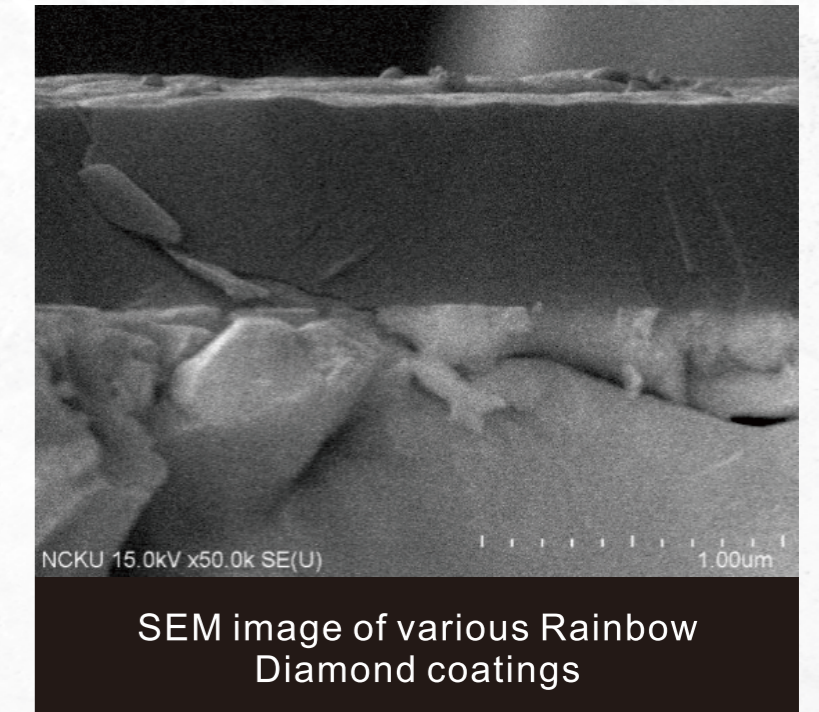
Coating Equipment

--- PEC-RD Series---

A new coating developed by ourselves,upgrated from Diamond like coating.Able to combine with nitride coating layer, reach a wider application.



Model	PEC500-RD
Technology	PECVD
Coatings	Rainbow Diamond
Foot print(mm)	W 1900 D 4000 H 2100
Internal chamber size(mm)	Ø850 x 950
Max. load(kg)	500
Usable plasma volume(mm)	Ø480 x 650
Spindles(mm) x PCS	Ø125 x 650 x 8
Sputter source	Stainless steel chamber with double walled jacket cooling
Heater(kW)	32
Cycle time(h)	4h (0,5~0,8µm)
Electrical connection	3Φ+Ground 380V , 150A



SEM image of various Rainbow Diamond coatings

ta-C Coating Equipment --- FCVA Technologies Series ---

In addition to DLC coating equipment, we provide superhard tetrahedral amorphous carbon(ta-C)coating by CNT filtered cathodic vacuum arc (FCVA) process. ta-C coating is made of pure carbon. ta-C coating has much higher hardness (Hv4000~6000) than amorphous hydrogenated DLC coating.

FCVA100 Hardware

Foot print(mm) : (W)3500x(D)1600x(H)2365
Internal chamber size(mm) : 450x450xH470
Max. Load : 100kg
Usable plasma volume(mm) : Ø360x100
Spindle(mm) : Ø125x150x6
Gun source : 2 set filter arc cathodic source
Electrical connection: 3Φ+Ground 380V,100A

Process

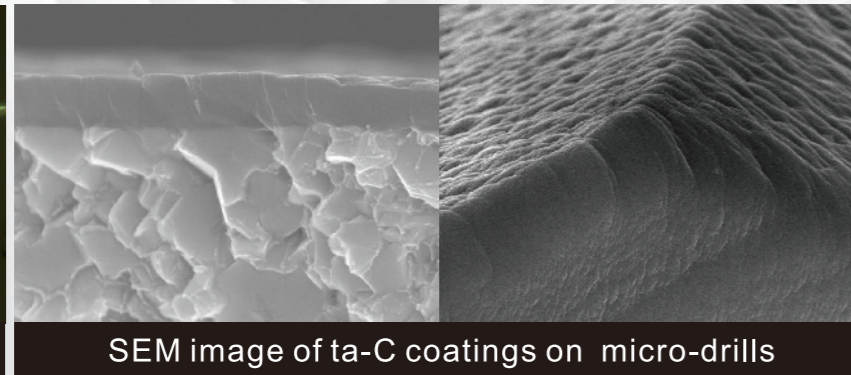
Optimized thickness from 0.1~1 μm
Cycle time(150~250nm):2.5~3h

Configuration To Order

FCVA350



FCVA process



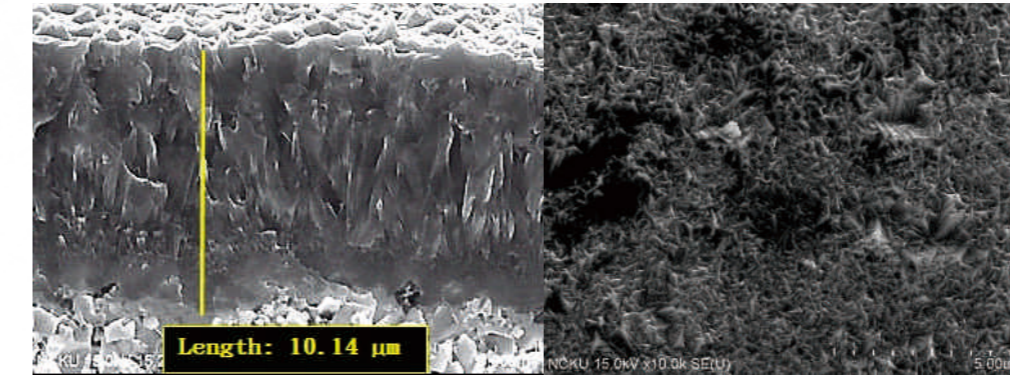
SEM image of ta-C coatings on micro-drills

CVD Coating technologies Thermal CVD technologies & Equipment for Tooling

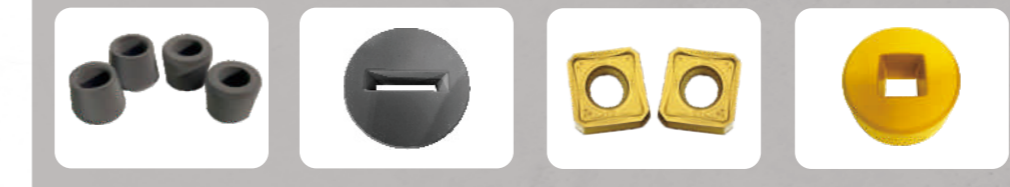
Thermal CVD (Chemical Vapor Deposition) is a method for producing low stress thin films by means of thermally-induced chemical reactions. The typical process temperatures for CVD coatings are between 900 and 1050 °C. Substrate materials are tungsten carbides, tool steels (SKD11, SKH9, SUS440), ceramics and graphite.

Applicable materials

- Tungsten carbide (can be reused by CVD coating to make up for wear and tear).
- SKD11, SKD61, SKH9, SUS440 | (Heat treatment is required to improve the hardness and shape of the substrate after CVD coating).
- Graphite, Ceramic.
- Low stress
- Excellent adhesion
- Excellent coating uniformity



SEM image of CVD coatings



Coating Products

DLC technologies



Me/DLC

DLC

PVD



AlCrN

AlTiN

TiX-H

GS

ECVA

PECVD

PVD+PECVD

CVD



ta-C

Rainbow Diamond coating

TS、TA

TiN

Diamond

Coating Properties (PVD)

Coatings	Color	Technology	Thickness (μm)	Hardness (HV)	Max operation Temp.(°C)	Coefficient of friction	Applications
TiN	Golden Yellow	PVD	1~5	2000~2300	500	0.5~0.6	✦ Cutting tools, punches, pressing die and biomaterials.
CrN	Silver gray	PVD	1~5	1500~2000	700	0.4~0.6	✦ Extrusion, stretching, sheet metal forming tools and machine components, etc. ✦ Cutting tools for Cu and anti-sticking of semiconductor parts.
AlCrN	Silver/gray	PVD	1~2	1500~3500	>1000	0.5~0.6	✦ Cutting tools, punches, Package die and components. ✦ It can machine hard materials (HRC55° ↑) efficiently even at high temperature in dry condition.
AlTiN	Black purple	PVD	1~4	3000~3500	900	0.4~0.6	✦ High speed turning, milling and drilling process. ✦ It is used for hard alloy and cast iron processing , especially in dry condition.
R7	Red brown	PVD	1~4	2500~3000	800	0.4~0.6	✦ Mills and drills for steel products and stainless steel(HRC48° ↓) ✦ It is especially suitable for non-continuity cutting in wet condition.
TiX-H	Metallic Golden	PVD	1~3	3800~4200	1100	0.5~0.6	✦ It can machine hard materials (HRC55° ↑) efficiently even at high temperature in dry condition.
AlTiCrN	Gray black	PVD	1~5	2800~3200	900	0.4~0.5	✦ Recommend to extend the lifetime and corrosion resistance of tools. ✦ It is suitable for both wet and dry cutting condition.
GS	Bright Golden	PVD	1~4	3200~4200	1100	0.4~0.5	✦ It can improve chips removal and be used for non-ferrous metal materials processing. ex: Ti, Ni based alloy... ✦ It can improve chips removal and be used for stainless steel (304, 316,4XX) process.
Me-DLC	Black	PVD	1~4	1800~2000	350	0.15~0.25	✦ Basic wear-resistant parts. ✦ Gage ,fixture, screwdriver and tools. ✦ Blowing bottle mould.

Coating Properties (PVD/PECVD/CVD)

Coatings	Color	Technology	Thickness (μm)	Hardness (HV)	Max operation Temp.(°C)	Coefficient of friction	Applications
TA	Dark Rainbow	PVD+ PECVD	1~5	3200~3500	900	0.1~0.2	✦ It can improve chips removal and be used for stainless steel (304,316) processing, hard Al alloy rough finishing .
TS	Golden Rainbow	PVD+ PECVD	1~4	3800~4200	1100	0.1~0.2	✦ It can improve chips removal and be used for steel (HRC55 ↑), Ti, Ni, Cu alloy processing.
Rainbow Diamond	Bright Rainbow	PECVD	1~2	1000~1500	600	0.1~0.2	✦ It is suitable for non-ferrous metal processing. ✦ Al, Cu, lead-free Cu and optical plastic machining, hard and soft PCB drilling, etc.
DLC	Black	PECVD	1~4	1800~2200	350	0.05~0.1	✦ CD-R disk mold, eye glass mold, mobile phone mold, semiconductor trimming die, plastic injection mold, IC molding mold, PM mold,aluminum extrusion mold, components of automobile and machine. ✦ ESD(Electro-static discharge) Coating , surface resistance(Ω) :10 ⁵ ~10 ⁹ . ✦ Cutting tools for Al (Mg) alloy, Cu alloy, plastic, ceramics, composites.
Me/DLC	Black	PVD+ PECVD	1~5	1800~3000	350	0.1~0.15	✦ Diesel injection, pressurization pump, cam shaft, piston, and other automobile parts.
ta-C	Blue Rainbow	FCVA	0.1~1	4000~6000	500	0.05~0.1	✦ PCB micro-drilling, cutting tools. ✦ Coating for heat dissipation in electronic component, and biomaterials materials.
Ti(C,N)	Dark gray	Thermal CVD	5~15	2000~3000	1000	0.35~0.7	✦ Inserts/ molds with groove, ditch, blind hole.. ✦ Especially used for punch pins, eye mold and trimming tools.
Diamond	Dark black	HFCVD	0.5~20	7000~9000	600	0.2~0.3	✦ End mills for non-metallic materials (graphite, ceramic, composites, grass fiber, carbon fiber) and non-ferrous metal(Al, Cu) processing. ✦ Coating for heat dissipation, semiconductor materials, electrochemical electrodes.