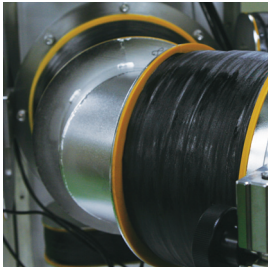


CARBOZEN™-FA SERIES



Filtered Cathodic Vacuum Arc System

Solutions for excellent surface roughness and ultra-hard coating



CARBOZEN™-FA SERIES

Solutions for excellent surface roughness and ultra-hard coating

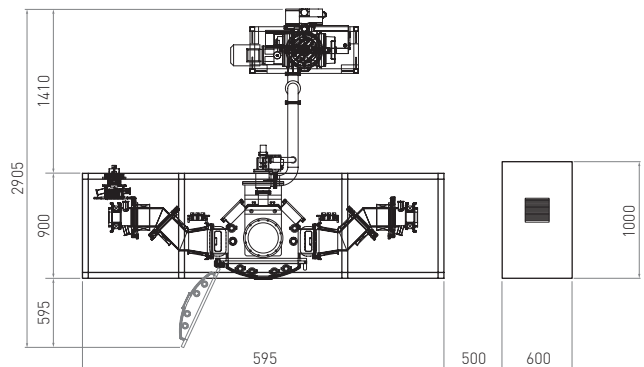


CARBOZEN™-FA(Filtered Cathodic Vacuum Arc) SERIES is an equipment for coating which utilizes an arc discharge, ion plating the Metallic targets of negative electrodes and coats the surface of the product. The biggest problem in the arc ion plating is a droplet (macro-particle) of μm size. This droplet reduces the properties of the thin film, in particular, surface roughness. CARBOZEN™-FA of J&L TECH is a device for smoothing by attaching a magnetic filter to remove droplets.

> System Specification

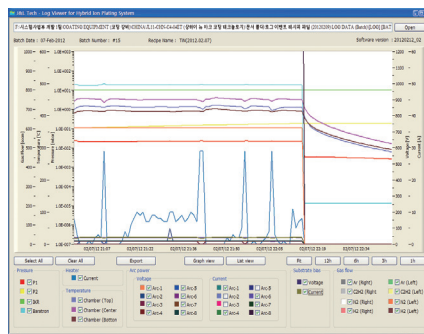
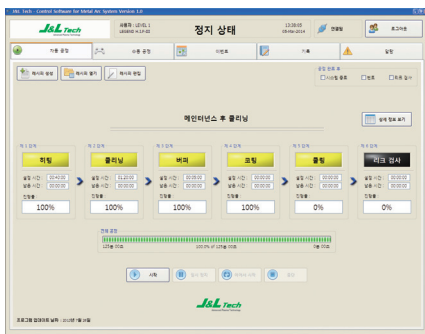
Chamber Size	ø600 x H600, Custom-made
Jig System	Rvolution and rotation with 2 fold or 3 fold
Working Gas	Mass flow control system Ar
Plasma Source	FCVA Source
The Initial Vacuum Degree	$\sim 10^{-6}$ Torr
Bias Power	Pulsed DC
Heater	Max 250 °C
Device Operation	Automatic / Semi-automatic

> System Lay-out

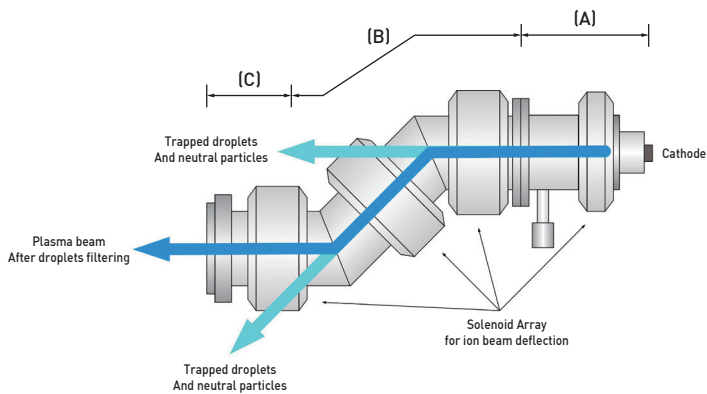


> Software of System Operation

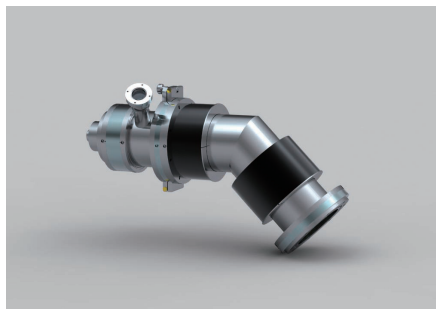
- Safety lock for the equipment and operator
- The process can be controlled easily by MS Windows
- Enables automatic recording of the work diary during the coating process
- The entire coating process can be made into data



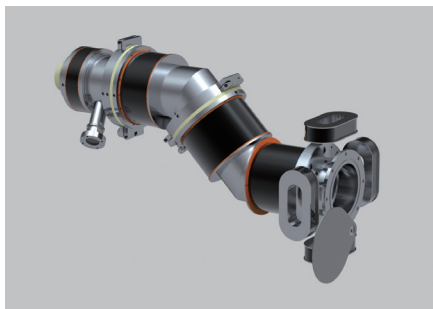
> Constructure and Principles of FCVA Source



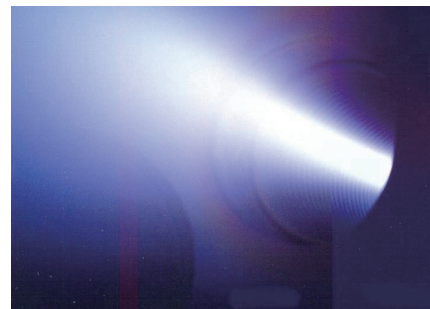
- Arcing Part (A) : Arcing from the cathode coating material
- Filtering Part (B) : Huge particle removal and transportation of generated plasma
- Exit Part (C) : Deposition of ion onto the substrate transported from filtered part



▲ Single bent



▲ Double bent



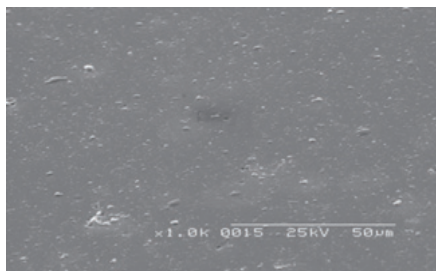
▲ Arc beam

> Advantages of FCVA Source

- Droplet elimination and ultra-smooth surface through dual-bent duct filtering
- Large area coating through Beam-rastering
- Innovative electrode design for stable plasma beam
- High adhesion for the substrate
- High reproducibility and ease of maintenance

> Characteristics of ta-C layer by Double Bent FCVA

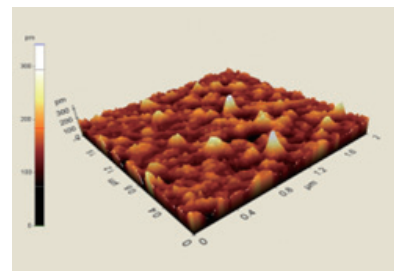
	Single bent	Double bent
Deposition Rate	30 nm/min	5 nm/min
Surface Roughness (Ra)	< 1.0 nm	< 0.5 nm
Hardness	~ 80 GPa	~ 80 GPa
Friction Coefficient	< 0.15	< 0.15



▲ Single-Filtering



▲ Double-Filtering (Ultra-Smooth)



▲ Scan area : 2x2 μm^2 , Ra = 0.02 nm

> Specification of FCVA Source

		Single Bent	Double Bent
Cathode	Material of the Target	Graphite	
	Size	ø75 x 25(L) mm	
Duct	Size	I.D.ø144 mm, O.D.ø165.2 mm	
	Angle	45°	
	Filtration Method	Single	Double
	Magnet	Source magnet (SM), Bending magnet (BM), Output magnet(OM), Raster magnet(RM)	Source magnet (SM), Bending magnet (BM), Emission magnet(EM), Output magnet (OM), Raster magnet(RM)

> Applications

Micro drills, endmills, cutting tools and engine component parts

