



***JEWELRY***



***WATCHES***



***BUILDING  
HARDWARE***



***TOOLS***

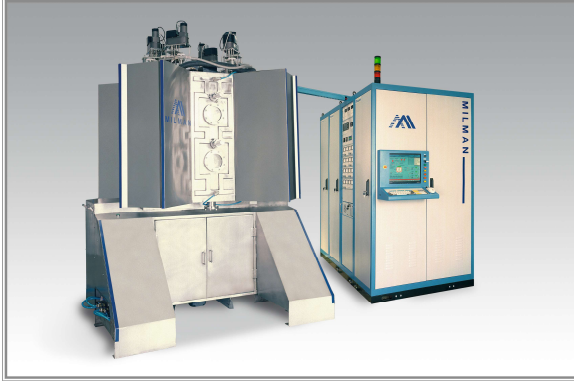
**PVD COATER**



# Large Volume Coaters based on state of the art Unbalanced MAGNETRON SPUTTERING and Advanced ARC Technology

## DECO COATER

- Large Volume Industrial PVD Coater with high loading capacity.
- State-of-art Plasma based Unbalanced Magnetron Sputtering Technology for droplet free smooth coatings with superior finish.
- 4 Large Rectangular Magnetron Cathodes (sources) for high uniformity.
- Fifth cathode is for gold sputtering.
- Versatility to deposit Decorative Coatings of TiN, TiCn, TiN / Gold, ZrN, CrN, CrCn etc.



## HYBRID DECO COATER

For the first time Hybrid Deco Coater combining Arc and Magnetron Sputtering

- 6 ARC cathodes in 2 pairs – for Gold / IPS
- 4 Magnetron Cathodes in 2 pairs – for Gold / IPS
- Perform TiN/ Gold or IPS without changing any Targets



## Common Features

- \* High Loading Capacity
- \* Flexibility
- \* Uniformity
- \* Lowest cost per piece
- \* Easy target change
- \* High Reliability and Low Downtime
- \* Advanced pulsed DC Technology for ION Etching
- \* Complete PLC / PC based Recipe, alarm and maintenance management



## # WHAT IS PVD?

**PHYSICAL VAPOUR DEPOSITION [PVD]** is modern Plasma based Vacuum Coating Technology which renders hard scratch resistant coatings for decorative and functional application.

In a vacuum chamber, metals such as titanium or chromium are evaporated in the presence of plasma and deposited on the preheated workpieces. This is done in combination with a reactive gas such as nitrogen or acetylene. This technique offers an excellent reproducibility. Coatings with a thickness of only a few micrometers (or even submicrometers) can be deposited with an excellent adhesion on the substrate surface.

## # WHY PVD?


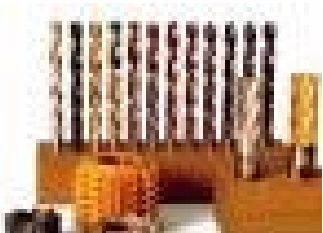

- PVD coatings combine extreme wear and scratch resistance with low friction, are chemically inert and are heat resistant.
- PVD coatings are applicable to both plastics and metals.
- A wide range of colours can be realized and perfect colour reproduction from batch to batch is possible.
- PVD processes are environmentally friendly and non-polluting because of the absence of hazardous emissions or chemical wastes.

## # APPLICATIONS

PVD coatings are widely used for decorative purposes. In addition to imparting superior mechanical properties to the surface, they also have aesthetic value. The applications may vary from bathroom and kitchen hardware, door hardware, automotive applications to jewelry, watches, writing instruments and spectacle frames.

Until today, electroplating of gold (more popularly called as wetplating of gold) is still the usual way of obtaining a thin layer of gold for decorative applications such as for artificial jewellery, watch cases and straps, spectacle frames etc. The disadvantage of the above process is that gold being extremely soft, gets rapidly eroded; also the process is very expensive due to the high costs of gold as a large thickness is required to obtain a minimum guaranteed lifetime. It is also very difficult to electroplate stainless steel with gold.

A solution to the above problem is a configuration involving the combination of a TiN layer and a gold layer. A very thin layer of gold (about 0.1 micron thick) is deposited with a thicker underlayer of TiN, thus combining the advantages of the hardness of TiN with the colour of gold providing longer life guarantee with considerable lower consumption of gold.

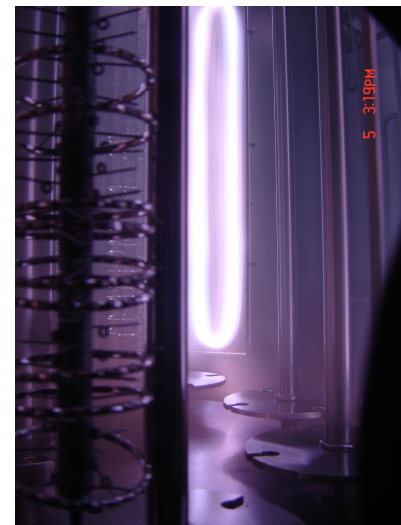
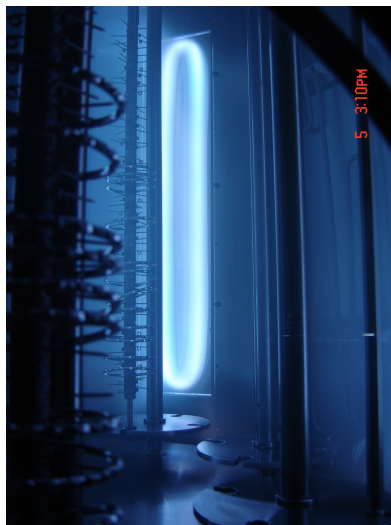
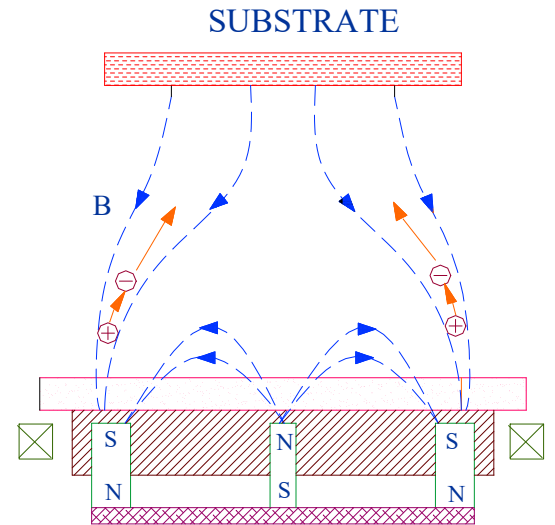
		
DECORATIVE	TOOL	FUNCTIONAL



## PROCESS TECHNOLOGY

### UNBALANCED MAGNETRON SPUTTERING TECHNOLOGY

- ❖ In UBM magnetic field is intentionally unbalanced.
- ❖ Unbalancing of magnetic field cause extension of source magnetic field towards substrate.
- ❖ Extension of magnetic field significantly increase bombardment of substrate.
- ❖ Greater density of plasma in the proximity of substrates.
- ❖ Coating of substrates more conformal than conventional magnetron even without application of substrate bias.



➤ **ADVANCED ARC EVAPORATION TECHNOLOGY**



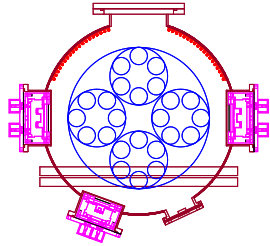
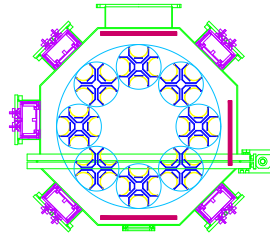
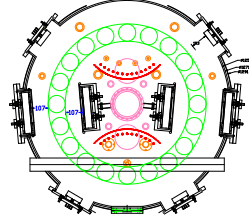
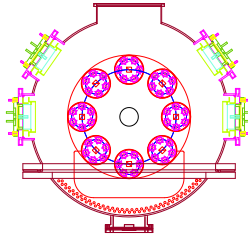
- ❖ ARC PLASMA IS IONIZED BETWEEN ANODE AND CATHODE
- ❖ ON ARC SPOT MATERIAL EVAPORATES AND IS DISTRIBUTED THROUGH THE CHAMBER AND ONTO SUBSTRATE

⊕ **DECORATIVE COATINGS**

- ❖ Polished brass : ZrN
- ❖ Gold appearance : TiN
- ❖ Silver grey , steel & chromium : CrN
- ❖ Black & grey : TiAlN
- ❖ Violet : TiCN
- ❖ Aubergine : TiAlN
- ❖ Various other colours possible on request
- ❖ Layers, which are offered, are, among others, TiN, TiCN, TiAlN, CrN, CrCN, Ti<sub>2</sub>N, ZrN and Metal-containing carbon layers.



⊕ **MILMAN PVD EQUIPMENT SERIES**

	<b>JEWEL COATER</b>	<b>DECO COATER</b>	<b>HYBRID DECO COATER</b>	<b>TOOL COATER</b>
<b>PROCESS TECHNOLOGY</b>	Unbalanced Magnetron Sputtering	Unbalanced Magnetron Sputtering	Combination of: Unbalanced Magnetron Sputtering And Advanced ARC Technology	Advanced ARC Technology
<b>NUMBER OF CATHODES</b>	2 + 1	4 + 1	6 ARC Cathode 2 + 2 Magnetron Cathodes	10 ARC Cathodes
<b>COATING ZONE</b>	Dia. 650 x 275 mm	Dia. 650 x 600 mm	Dia. 1000 x 600 mm	Dia. 550 x 500 mm
<b>APPLICATIONS</b>	Jewelry	Jewelry	Jewelry Tools	Tools
				



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