



VDS100 Thin Film Deposition System is a compact tool for RF/DC magnetron sputtering, thermal evaporation or Low Temperature Evaporation (LTE) organic deposition and is glove box compatible.

The system is designed for substrates 100mm x 100mm or 150mm diameter or smaller. The system is fully integrated, performance tested and supported.

Vacuum Techniques offers the VDS100 Thin Film Deposition System, which is a versatile entry-level deposition tool for RF/DC magnetron sputtering, thermal evaporation or Low Temperature Evaporation (LTE), or any combination of these methods. It is widely deployed in research, academia and pilot production facilities.

These systems are designed with advanced automation and the flexibility for customization for applications with various options or with OEM equipment.

With a robust gas and pneumatic system combined with advanced automated features, these systems deliver significant value and time savings. They are in use in a wide spectrum of applications from rugged environments to advanced sophisticated clean room use cases.

With a wide variety of deposition options, these systems are versatile and configurable as per the application and customer requirements. These systems can be optimized for the OEM equipment or other vacuum apparatus inside the deposition system.

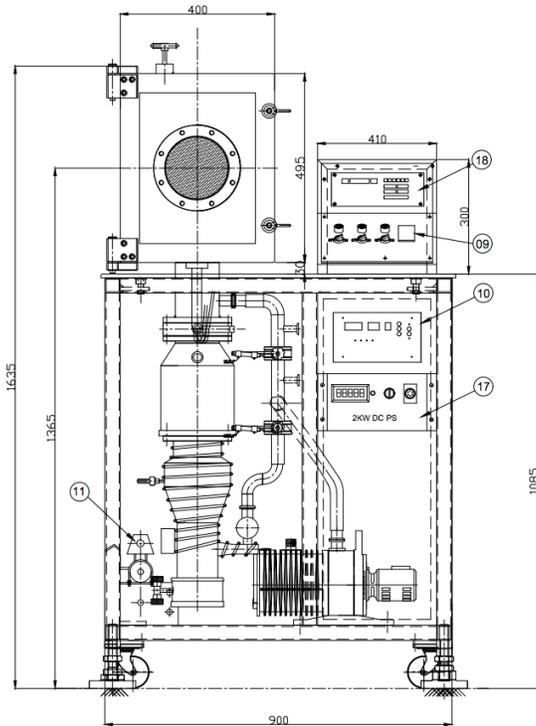
These systems are backed with remote and onsite support, and dedicated spare parts and accessories availability.

KEY FEATURES

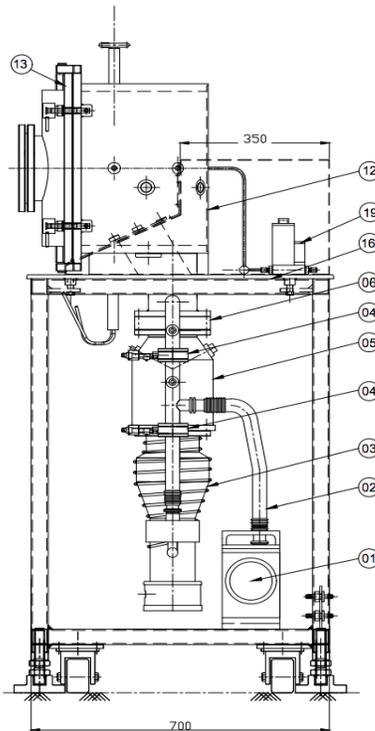
- Fully integrated deposition system
- Supports RF/DC magnetron sputtering, thermal evaporation or LTE sources
- Multiple sources sequential or co-deposition modes
- Multiple process gas capability
- Supports up to 100mm x 100mm or 150mm diameter substrates or smaller
- Glovebox mating provisions included
- High deposition rate & high efficiency cathode
- Simple and easy maintenance
- Wide configuration options & customizable to the application requirements

VDS 100

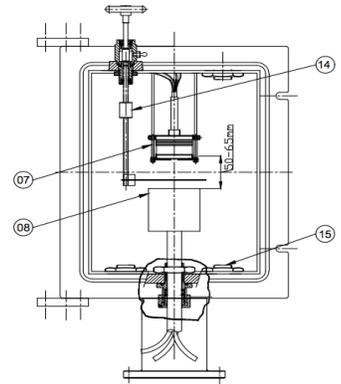
SYSTEM FRONT VIEW



SYSTEM RIGHT SIDE VIEW



SYSTEM INTERNAL VIEW



VDS 100 THIN FILM DEPOSITION SYSTEM ASSEMBLY

1. Rotary Vane Pump
2. Matallic Hose
3. Diffusion Pump
4. Electro-pneumatic Butterfly Valve
5. Liquid Nitrogen Trap
6. Electro-pneumatic Butterfly Valve
7. Substrate Heater
8. Magnetron Sputtering Cathode
9. PID Controller
10. Combined Vacuum Gauge
11. Water Flow Switch
12. Chamber Assembly
13. Chamber Door Assembly
14. Shutter Assembly
15. Nut Assembly
16. Stand Assembly
17. RF Power Supply
18. Digital Thickness Monitor
19. Mass Flow Controller



MAGNETRON SPUTTERING SOURCES

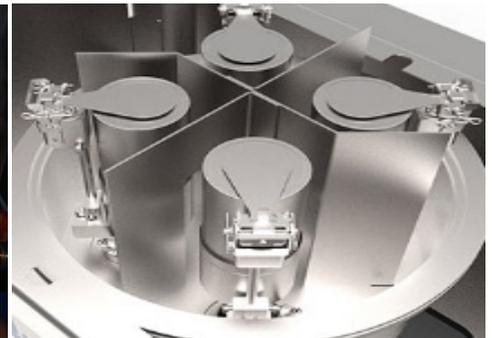
Magnetron sputtering option offers water cooled magnetron cathodes with the ability to tilt, adjust the height and orientations from target to substrate.

The magnetrons can be configured for magnetic and non-magnetic materials and are powered with DC or RF power sources allowing for a wide range of materials to be deposited. Typically, the configuration is sputter up. However, with magnetron sputtering only configured, sputter down is possible as well. Substrate heating up to 800°C and can be optionally RF or DC biased. The system includes controlled gas manifold for up to three process gases.



THERMAL EVAPORATION SOURCES

Thermal Evaporation option offers source assembly to hold different types of sources (spirals, baskets, filaments and boats of different materials of standard lengths). The target material is heated to its evaporation point by joule heating of a resistive boat where the target is placed. The vapourized material travel to the substrate where they nucleate together forming a thin film coating. This process can be used for a wide variety of materials such as Aluminum, Silver, Nickel, Chromium, Magnesium, and so on.



LOW TEMPERATURE EVAPORATION SOURCES

Low Temperature Evaporation (LTE) option offers organic material evaporation source with integrated flip shutter. This method deposits volatile organic materials for thin film formation needed to produce organic light emitting devices (OLEDs), photovoltaic cells, and other organic material-based devices. Vapourization of these materials usually take place at <600°C. Organic materials under vacuum conditions are extremely sensitive to temperature (small temperature increase can increase the deposition rate).

SYSTEM SPECIFICATIONS

Chamber Geometry	Stainless steel AISI 304L D- Shaped Chamber with front hinged door
Dimensions	350mm (Diameter) x 400mm (Height)
Inside & outside surface	Electro-polished finish inside with grit blast finish outside
Leak rate	$< 10^{-9}$ mbar ltr./sec
Deposition Sources	Up to (3) 2" or 3" Circular Magnetron Sputtering Cathodes
	Up to (4) 2" Thermal Evaporation Sources
	Up to (4) LTE Organic Material Evaporation Sources
	Combination Baseplate of (2) 2" Thermal & (2) LTE Sources
Deposition Orientation	Combination Baseplate of (2) 2" Thermal & (2) Magnetron Sputtering
	Sputter up, Evaporation up
Source Shielding	Co-deposition options
Substrate size	Cross contamination shields
Substrate holder	Typical 50mm x 50mm
	Max up to 100mm x 100mm, 150mm (Diameter)
Standard Vacuum Pumping	Standard holder with pins to hold the substrate
	(Wet) 500 l/s Oil Diffusion pump backed with 15 m ³ /h oil-sealed rotary vane pump Foreline trap, mist eliminator, roughing valve
Vacuum Measurement	(Dry) 260 l/s turbo-molecular pumping backed with 5 m ³ /h dry scroll pump with roughing valve
View Port	Pirani & Penning gauges in the chamber, and Pirani gauge in the vacuum pumping line
Process Gas	DN 100 View Port on the chamber door with manual shutter
Process Pressure	Up to (3) Mass Flow Controllers (MFC)
Thickness Measurement	Manual needle valve based pressure control
System Base	Thin-Film Thickness Monitor with display
System Control	Fully enclosed system base cabinet with leveling pads and caster wheels
Required Power (based on base options)	HMI based semi-automatic control system, with optional recipe control and datalogging
	220V-240V AC, Single Phase, 50Hz

MAGNETRON SPUTTERING SOURCES

Assembly	High strength, NdFeB (Neodymium Iron Boride)
Magnet Options	Magnets are not exposed to cooling water
	Balanced and Unbalanced magnet options
Operating Pressure	0.5×10^{-5} mbar - 0.5×10^{-3} mbar
Target Sizes & Thickness	Sizes of 2", 3" and 4" OD, and up to 0.375" thickness
Sputtering Power Supply	RF: 13.56 MHz 300W RF Generator, 300W RF Auto Matching Network, Matching Network Controller, connectivity between Units and Cathode, Output Impedence: 50 Ohms, +/- 5 Ohms Nominal
	DC: 1000 W DC Output Power, with 230V, 50Hz Single Phase AC Input

THERMAL EVAPORATION SOURCES

Thermal Source	Source is capable of accommodating spirals, baskets, filaments and boats of Tungsten/Molybdenum of standard lengths
	Programmable DC Supply 200A - 400A
	Water-cooled evaporation feedthrough

LOW TEMPERATURE EVAPORATION ORGANIC SOURCES

Temperature Range	50°C to 600°C with PID control with fine temperature control
	Programmable DC Supply 100A - 400A
Crucible & Charge Capacity	5 - 15cc Alumina

OPTIONS/UPGRADES

Chamber	Box, cylindrical, and spherical options with various dimensions and ports
Ports	Additional ports, view ports, and other hardware configurations can be made
Load lock	Load Lock Subsystem with sample transfer adaptability
Vacuum Pumping System	Diffusion pump backed with rotary vane pump (various pumping capacities)
	Scroll backing up or Cryo pumping or other pumping options (various pumping capacities)
Vacuum Measurement	Capacitance gauge, Hot Ionization gauge
DC Power Supply Options	500W, 1000W or 1500W DC Power Supply
DC Pulsed Power Supply	1000 W DC Output Power, with 230V, 50Hz Single Phase AC Input
	Output voltage, output current, pulse width, and pulse frequency are all controllable
	Frequency: 1Hz to 100kHz, Output Voltage: 800V, Negative or Positive Polarity
RF Power Supply Options	13.56 MHz 600W RF Generator, 600W RF Auto Matching Network, Matching Network Controller, connectivity between Units and Cathode, Output Impedance: 50 Ohms, +/- 5 Ohms Nominal
Contamination Shielding	Removable stainless steel contamination shielding on the chamber walls
Substrate cleaning	RF based etching to clean chamber and substrate
System Automation	Fully-automatic with SCADA and recipes
Substrate	Adjustable Size & Height Available for Substrate Stage
	Motorized Shutter Assembly
	Water cooled substrate stage; Heating up to 800°C; With motorized rotation; or combination of
Cooling System	Water Chiller of appropriate capacity with PID control
Glovebox Integration	Integration with LABPRO glovebox systems
Pressure Control	Downstream pressure control with motorized throttle valve
	Downstream pressure control with PID feedback: Using motorized throttle valve and manometer
Deposition Control	Closed loop thin-film deposition controller with digital display
	Glancing Angle Deposition (GLAD) with rotation
Diagnostic tools	Residual Gas Analysis (RGA), Reflection High-Energy Electron Diffraction (RHEED), or ellipsometry
Organic Effusion Cell	Up to (3) Organic Effusion Cell with shutter and PID controller (Chamber length ~500mm (min))

APPLICATIONS

R&D of Thin Film Deposition	OLED & Organic Electronics Applications
Perovskite Solar Cells Applications	Nanotechnology
Organics Field Effect Transistors	Semiconductor Failure Analysis
Photovoltaics and Semiconductor Devices	

Vacuum Techniques Pvt. Ltd is leading manufacturer of vacuum equipment, components and vacuum instruments for academic, research and industrial markets. With over 30 years of engineering experience and leading innovation, we continue to develop customer specific products and solutions.



VACUUM
TECHNIQUES Pvt. Ltd.

VACUUM TECHNIQUES PVT. LTD.
2/13 Phase 1, Peenya Industrial Area,
Bangalore 560058, Karnataka, India
www.vtvacuumtech.com
info@vtvacuumtech.com; +91.80.2839.2746



PART # VDS100-03