



# HIGH VACUUM, TRIPLE MAGNETRON TARGET DESK SPUTTER COATER-DST3-A/S

The High Vacuum, Triple Magnetron Target Desk Sputter Coater-DST3-A/S is a versatile multi-target vacuum coater system, featuring turbo molecular pumping, suitable for depositing a wide range of materials. It comes with a spacious chamber with a diameter of 300 mm and is equipped with three 2" diameter water-cooled cathodes, allowing for extended deposition periods.

This Triple Magnetron Target Desk Sputter Coater is well-equipped with both RF and DC power supplies, enabling it to effectively sputter semiconductors, dielectrics, and various metal targets, including both oxidizing and noble metals. To optimize the RF sputtering process, the system includes an auto-adjustable matching box, which minimizes reflected power.

For enhancing film adhesion to the substrate and improving film structures, there is also an optional feature that allows the application of a 300 V DC bias voltage to the substrate.

Depending on the condition of the cathodes, the DST3 is offered in two distinct models.

## **APPLICATIONS**

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- Metal, semiconductor, and dielectric films
- Nano and microelectronic applications
- Solar cell development
- Co-sputtering processes
- GLAD sputtering technique
- Coating of optical components
- Thin film sensor fabrication
- Production of magnetic thin film devices
- Fine-grain structural deposition for SEM and FE-SEM sample preparation

## **FEATURES**

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## Hardware:

- High vacuum level with a built-in turbo pump
- Equipped with DC and optional RF power supplies suitable for metals, semiconductors, and dielectrics
- Three 2-inch water-cooled angled magnetron cathodes suitable for producing alloy films (DST3-A) and multilayer deposition
- Large sample holder stage (8 inches) for DST3-S model
- Cathode mask designed for uniform deposition on large substrates (DST3-S)
- Two fixed and movable quartz crystal monitoring systems for real-time thickness measurement (precision of 1 nm)
- Gas injection control through two Mass Flow Controllers (MFCs)
- Electronic gas valves
- Two-stage rotary vane backing pump (Diaphragm and scroll pump)
- Full range vacuum gauge
- Cathode selection motor
- Sample rotation, height, and tilt adjustable (for 3-inch sample holders)
- Equipped with 3 manual or optional electronic shutters
- Programmable substrate heater (optional)
- Unlimited deposition time without breaking vacuum
- Two-year warranty

## Automation:

- An intuitive touch screen for easy control of the coating process and quick data input
- User-friendly software that can be updated via a network connection
- Optional semi-fully automatic coating process
- Repeatable and programmable sputtering process in automatic mode

- Optional adjustable parameters for DC, RF, and high current deposition through the touch screen panel
- Manual or automatic timed and thickness deposition
- Capability to store coating recipes for repeatable depositions
- Target selection for multilayer thin films
- Electronic shutters for precise control
- Automated cathode selection
- Substrate heater programming and control through the software

## **Optional Facilities:**

The DST3 vacuum coater features a cylindrical Pyrex vacuum chamber with a 300 mm outer diameter and a height of 200 mm. It is equipped with an internally mounted 90 L/s turbo molecular pump, which is supported by a 6m<sup>3</sup>/h two-stage rotary vane pump for efficient vacuum operation.

## **Clean Vacuum**

- RF sputtering for the deposition of both conductive and non-conductive targets
- Plasma cleaner for enhanced cleaning capabilities
- 300 V DC substrate bias voltage
- 500 °C substrate heater for precise temperature control during the coating process.

## **Touch Screen Control**

The DST3 comes with a 7" colored touch-screen panel, featuring user-friendly software for seamless control and adjustment of the deposition process data. You can easily monitor the vacuum and coating sequence information, which is displayed as digital data or curves on the touch screen. Additionally, the system stores information on the last 300 coatings in the history page for your convenience.

Desk Sputter Coater

## **Sample Holder Stages**

The sample holder comes in two standard sizes: 3 inches, which is available in both DST3-A and DST3-S models, and 8 inches, exclusive to the DST3-S. However, users have the flexibility to request custom sizes tailored to their specific requirements. The smaller sample holders are equipped with multiple clamps designed for securely holding small samples during rotation, offering a straightforward and effective solution.

## **Plasma Cleaner**

DST3 can be optionally equipped with a plasma cleaner. Plasma treatment or cleaning involves the removal of organic substances from a substrate's surface or modifying it using ionized gas, known as plasma. This process can alter the substrate's surface properties, enhancing either its hydrophilicity or hydrophobicity to facilitate subsequent depositions effectively. Additionally, applying plasma to the substrate before depositing thin films helps eliminate surface contaminants, such as carbon-based residues and oxides, while improving the adhesion between the substrate and the subsequent layers.

## **THEORY & METHOD**

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# DST3-A (Angled Cathodes):

The DST3-A features three angled cathodes that share a common focal point. This configuration allows for simultaneous sputtering from two or three (optional) targets, enabling the formation of alloys or multilayer depositions. In this model, the maximum substrate size is 3 inches.

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# DST3-S (Straight Cathodes):

The DST3-S model is equipped with three straight 2-inch water-cooled cathodes and is designed for sputtering a single large specimen with a diameter of up to 20 cm or several smaller specimens.

## TECHNICAL SPECIFICATIONS

- Ultimate Vacuum: Less than 8x10-6 Torr

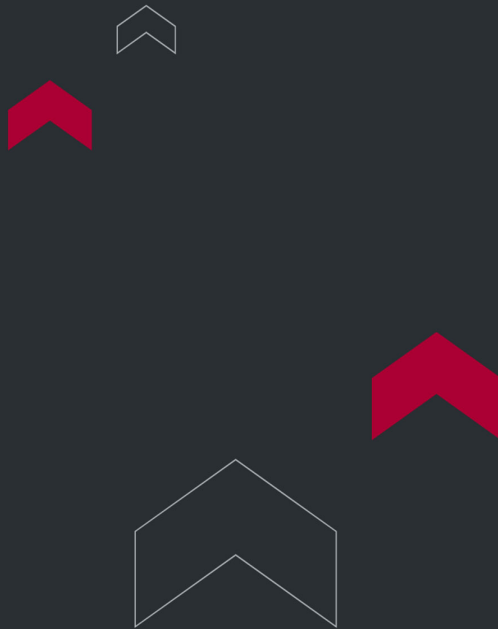
| Table Header             |                    |                    |
|--------------------------|--------------------|--------------------|
| Pumping Speed (l/s)      | 90                 | 350                |
| Ultimate Pressure (Torr) | 8×10 <sup>-6</sup> | 3×10 <sup>-6</sup> |

- Each cathode can independently control the sputtering rate to produce fine-grain structures.
- The maximum thickness for each target, including the backing plate, is 6 mm.

- The deposition power is automatically controlled regardless of the pressure.
- The cathode temperatures are automatically regulated to prolong the life of the magnets.
- Data is quickly recorded using fully automatic touch screen control.
- Two precision Mass Flow meters (MFC) allow precise control of vacuum pressure and the flow of argon or other reactive sputtering gases.
- An electronic throttle valve is included for the 350 l/s turbo pump.
- Coating parameters are recorded and plotted.
- Curves and data from the deposition process can be transferred via a USB port to a PC.
- An optional 300V DC bias voltage can be added.
- There's an option for a plasma cleaner.
- The system includes a 0-1200 V, 0-500 mA DC power supply.
- An optional 300 W RF power supply with an automatic matching box is available.
- Utilities: 220/110V, 50/60HZ, with a current rating of 16/25A.
- Instrument Dimensions: 600 Width × 800 Depth × 770 Height mm (excluding the rack).
- Net Weight: 160 kg, including the pump, rack, and instrument case.

## **Options and Accessories**

- Quartz crystal sensor
- Spare glass chamber
- Sputtering targets
- Sealing gaskets
- 300V DC bias voltage
- Plasma cleaner
- 500°C substrate heater



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