

M307

Entry-level physical vapour deposition system with on-board water-cooling



Key Features:

- Modular design for upgrading
- Sequential deposition
- Stainless-steel base-plate
- Stainless-steel or pyrex bell-jar chamber
- Turbomolecular pumping as standard
- Base pressure $< 5 \times 10^{-7}$ mbar
- On-board water-cooling
- Up to 4 thermal evaporation sources
- Up to 2 x 2" magnetron sputtering sources
- Up to 2 x LTE sources for organics
- Sample rotation
- Thin-film monitoring and/or control

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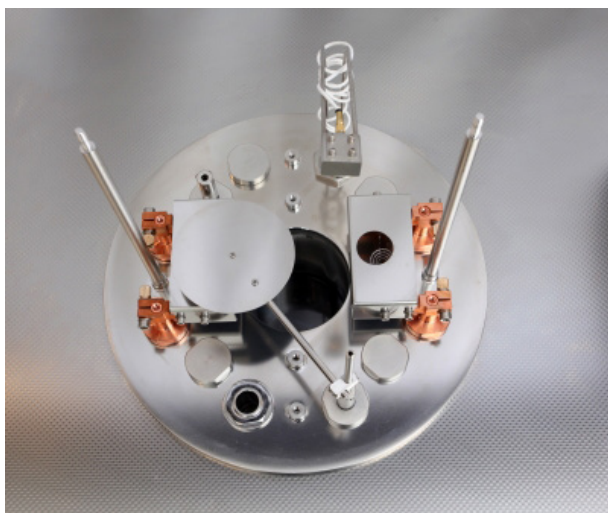
Overview:

Moorfield have recently introduced the M307 bell-jar thin film deposition system. Designed as an entry-level product with upgrade flexibility, it has been derived from proven R&D thin-film system technology developed through extensive collaboration with leading academic groups. The M307 is an extremely compact system optimised for ease of use but without compromising the film qualities provided. It represents outstanding value for money. It even has its own on-board water-cooling system making installation a simple task.

Configuration:

The M307 is a floor-standing tool optimised for uniform deposition onto substrates with maximum diameters of 4", and is capable of standard thermal evaporation, low temperature evaporation (LTE; for organics deposition) and magnetron sputtering. All power supplies and controller units are fully integrated within the system electronics rack. The vacuum chamber can be a glass bell-jar or stainless-steel box-type, and is fitted with removable deposition shielding for minimised cross-contamination. The pumping system is based on a turbomolecular pump, with both rotary and scroll-type backing pumps available. Chambers are configured for upwards deposition. An optional platen heater assembly allows for temperatures of up to 500 °C (stainless-steel chamber only).

Thermal evaporation: The unit can be fitted with up to 4 standard resistive thermal evaporation sources for deposition of metals, e.g., for contact electrode formation. Moorfield model TE1 sources are boxed components, allowing for improved deposition efficiency, less stray IR that can lead to unwanted heating of substrates and other in-chamber hardware, and reduced deposition on chamber sidewalls. Water-cooled feedthroughs provide power to the sources.



Above: M307 chamber base-plate configured with 2 Moorfield TE1 evaporation sources, source shutter and quartz crystal sensor head for rate monitoring.

Low-temperature evaporation: For organics, e.g., for OLED, OFET and OPV research, the unit can be equipped with up to four LTE sources. The sources can be operated in power or temperature control modes, and can also be linked to an optional thin-film process controller. Available source crucible volumes are 1 CC, 2CC and 5 CC.

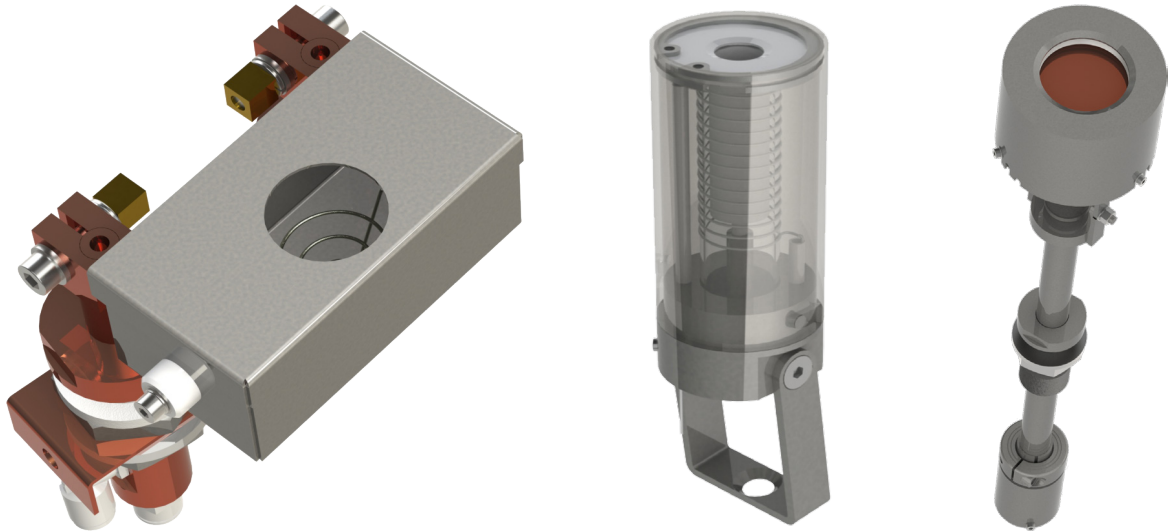
Magnetron sputtering: For sputtering, which requires a stainless-steel box chamber, the system is fitted with a throttle valve (for protecting the turbomolecular pump from high gas loads), gas admission valves and a maximum of two Moorfield *FlexiHead* MAGNETRON sputtering sources (industry-standard 2" targets). Reactive sputtering is possible, e.g., via O₂ and N₂ introduction. Sources are typically mounted on the chamber base-plate confocal to the platen's centre of rotation. RF and DC



Above: Lifting off the M307 bell-jar to access in-chamber hardware.

power supplies are available, for deposition of both metals and dielectrics.

Multi-technique systems: M307 systems can also be configured with multiple of the above techniques.



Above: Deposition sources available for the M307: Moorfield TE1 source for standard thermal evaporation (left), Moorfield LTE-1CC source for low-temperature evaporation (LTE; middle) and Moorfield *Flexi-Head* MAGNETRON source for magnetron sputtering (right).

Technical Specification:

Chamber: Standard configuration for bell-jar of 365 mm height and 305 mm ID with implosion guard. Stainless-steel base-plate. Option for stainless-steel box chamber. ISO100 turbomolecular pumping port with optional throttle valve (for sputtering). Viton o-ring seals.

Safety interlocks: Water and vacuum levels.

Pumping group: Water-cooled Edwards or Leybold turbomolecular pump. Edwards rotary or dry scroll-type backing pump.

Pressure measurement: Wide-range gauge and optional capacitance manometer.

Substrate stage: 4" diameter platen with motorised rotation. Optional rear-side quartz lamp heating module.

Deposition sources: Various types depending on requirements (see above). Separate brochures available for all Moorfield source types.

Power supplies: Various types depending on integrated techniques. All power supplies fully integrated within system electronics rack.

System control: Industrial-grade, high-stability PLC electronics core. Designed for safe operation and reliable vacuum integrity.

Water-cooling: No external supply required. On-board circulation/chilling system provides for approx. 2 L/min at 20 °C.

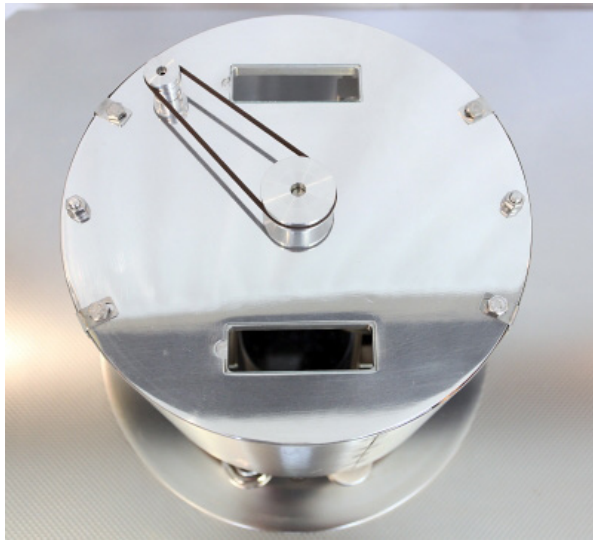
Weight: Approximately 260 kg; dependant on configuration.

Size: 920 mm (height) × 700 mm (depth) × 1200 mm (width).

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Above: M307 system control panels, mounted in the electronics rack included with the unit. Left: Vacuum monitoring and pump/vent control unit. Right: Thermal evaporation power supply and control unit (for system configured for thermal evaporation).



Above: In-chamber deposition shielding with observation slide windows and substrate rotation mechanism.

Options:

- Extended-height bell-jar and stainless steel chambers
- Substrate rotation
- Substrate heating
- Dry backing pump
- Quartz crystal sensor heads
- Thin-film monitors and controllers (e.g., Inficon SQM-160 and SQC-310)

Applications:

- Fundamental research
- Education
- Product R&D

System Requirements:

- Electrical power: 220–240 V_{AC} 13 A
- Vent gas: N₂ at 5 psi
- Pneumatics: N₂ or CDA at 60 psi
- Process gas (if required): 99.99% at 5 psi
- Coolant water: Provided by on-board system (see above)

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