

MiniLab 070

Modular system for high-quality physical vapour deposition



Key features:

- Modular design
- Front-loading box-type process chamber
- Turbomolecular pumping systems
- Base pressures $< 5 \times 10^{-7}$ mbar
- Thermal evaporation
- Low-temperature evaporation (LTE)
- Electron-beam evaporation
- Magnetron sputtering
- Metals, dielectrics and organics deposition
- Up to 11" diameter substrates
- Touchscreen HMI/integrated PC for control
- Easy servicing
- Comprehensive safety features
- Cleanroom compatible
- Load-locks available
- Proven performance

MOORFIELD
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Overview:

MiniLab systems from Moorfield provide superior coating performance, with the flexibility and modularity of design to address a huge range of potential applications.

The MiniLab range consists of several platforms. Each platform is generally associated with a specific process chamber size. While all chambers are built to the same standards and allow for high-vacuum operation, larger chambers allow for more techniques and flexibility than their smaller counterparts. In addition to thin-film deposition, MiniLab systems can also be fitted with complementary techniques such as ion beam sources, etching components and annealing stages (platform-dependent).

MiniLab 070 platform:

MiniLab 070 systems are floor-standing vacuum evaporators for metal, dielectric and/or organics thin-film deposition. All systems contain a box-type stainless-steel process chamber with front door for loading/unloading. A turbomolecular pumping system is standard, for high-vacuum base pressures of better than 5×10^{-7} mbar. Exact configuration is extremely flexible and dependent on customer budgets and applications

Control system:

User operation is via a 7" touchscreen HMI or integrated PC. Powerful but easy-to-use software allows for system setup and operation via a menu-driven interface (note that manual control via electronics rack front panels is also possible, depending on exact system configuration). Data-logging and advanced diagnostics are standard features.

MiniLab 070 technical specifications:

Chamber

438 mm × 425 mm × 425 mm stainless-steel front-loading box chamber. Hinged front door for easy access. Chamber baseplate, top and sides fitted with ports for in-chamber hardware. Shuttered viewport for process observation. Viton o-ring seals. Optional water-cooling channels.

Safety interlocks

Water and vacuum levels.

Pumping group

Water-cooled turbomolecular pump, up to 400 L/s. Rotary or dry scroll-type backing pumps up to 15 m³/hour.

Pressure measurement

Wide-range gauge (Edwards or Inficon) and optional capacitance manometers for high-resolution measurement.

Substrate stages

Stainless steel, aluminium or copper with threaded holes for substrate attachment. Up to 11" diameter substrates. Optional rotation, heating, cooling, bias and Z-shift modules.

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.

Deposition monitoring and control

Various components including the Inficon SQM-160 (2-channel monitor) and Inficon SQC-310 (process controller).

Weight

Approximately 100–200 kg; dependent on configuration.

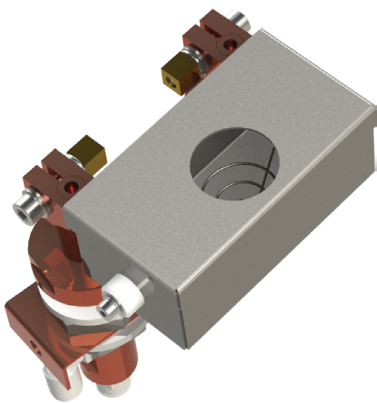
Approximate Size

1900 mm (height) × 590 mm (depth) × 1271 mm (width), excluding backing pump—flexible location; dependent on configuration.

Configuration and options:

The MiniLab 070 base configuration includes a turbomolecular pump positioned on an ISO160 port at the rear of the process chamber. The chamber sits on a double-rack frame that contains all system control electronics and power supplies. MiniLab 070 systems are available with load-locks.

Systems can be equipped with a wide variety of deposition techniques. These include thermal and low-temperature evaporation sources (for metals and organics), magnetron sputtering sources (for metals and inorganics) and electron-beam sources (for most material classes except organics). Deposition sources are typically mounted on the chamber baseplate, but sputter-down configurations are also available. Substrate stages, usually at the top of the chamber, can accommodate substrate sizes up to 11" diameter. Substrate heating, rotation, bias and Z-shift are available, together with source and substrate shutters. Examples of configurations for specific applications are listed below.



Moorfield TE1 source for standard thermal evaporation



Moorfield LTE-1CC source for low-temperature evaporation



Moorfield Flexi-Head MAGNETRON source for magnetron sputtering

Thermal evaporation

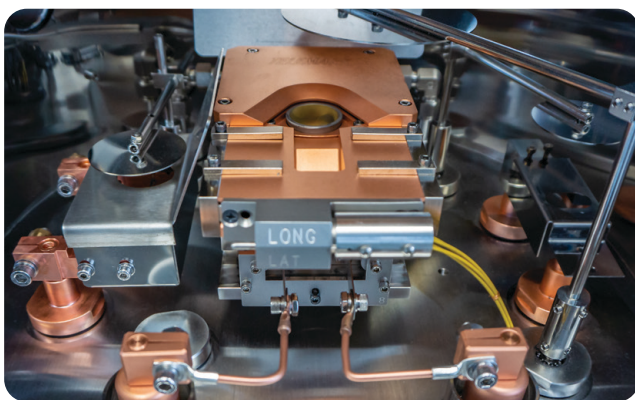
Up to 4 thermal evaporation sources. Moorfield TE1, TE2, TE3 or TE4 configurations available. Water-cooled power feedthroughs and boxed shielding for excellent vacuum maintenance and low contamination. Power supplies available for automatic, manual, sequential- and co-deposition.

Low-temperature evaporation

Up to 4 organics sources. Moorfield LTE-1CC, LTE-2CC and LTE-5CC models available. Alumina or quartz crucibles. Power supplies equipped for temperature and power control, in automatic and manual modes.

Magnetron sputtering

Up to four Moorfield MAGNETRON sources for 2", 3" or 4" industry-standard targets (easy fitting/removal). RF, DC or pulsed DC power supplies, fully integrated with system controller. Various gas and pressure control packages, including MFCs for process gas introduction. Throttle valve for protecting pumping system from gas loads.



Telemark multi-pocket water-cooled electron-beam source

Electron-beam evaporation

Telemark multi-pocket (e.g., 6 x 7 CC or 8 x 4 CC) electron-beam evaporation sources. Sources are water-cooled and can be connected to automated pocket indexer modules. Ferrotec 3 kW, 5 kW and 10 kW power supplies available.



Multi-technique systems

Various combinations of all of the above can be included in MiniLab 070 systems. For all techniques, deposition rate monitoring (via quartz crystal sensor heads) together with thin-film monitors and controllers are available.



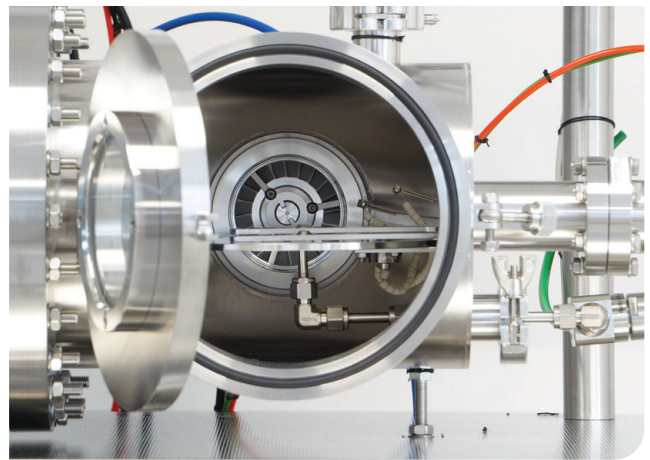
PC user interface for system control and monitoring. Manual and automated modes of operation.



Viewport with integrated shutter to protect the window when not in use.



MiniLab 070 tool with sputter-down configuration



Load-lock chamber customised with a substrate gas-cooling station

System requirements: (typical configuration)

- Process gases: 25 psi supplies, 99.99% purity or better
- Service gas: Dry compressed air, nitrogen or argon, 60–80 psi supply
- Vent gas: N₂, 5 psi
- Power: Single-phase 230 V, 50 Hz, 13 A
- Chilled water: 18–20 °C, 3 L/min, pressure < 4 bar
- Exhaust extraction

Applications:

- Fundamental research
- Education
- Product R&D
- Pilot-scale production

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