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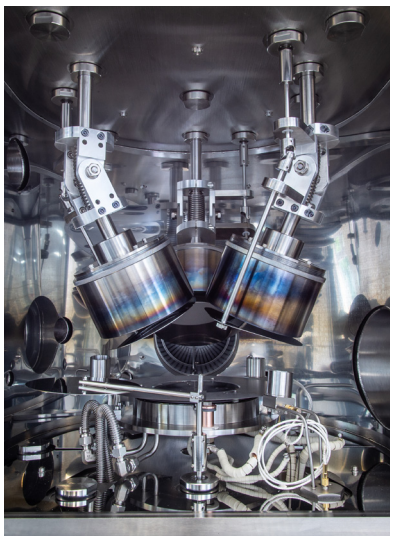
MiniLab 125

Modular system for high-quality physical vapour deposition



Key features:

- Front-loading box-type vacuum chamber
- Modular design
- Front-loading box-type process chamber
- Turbomolecular/cryogenic pumping systems
- Base pressures < 5 × 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
- Cleanroom compatible
- Load-locks available
- Proven performance

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PRODUCT INFORMATION

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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 customer requirements.

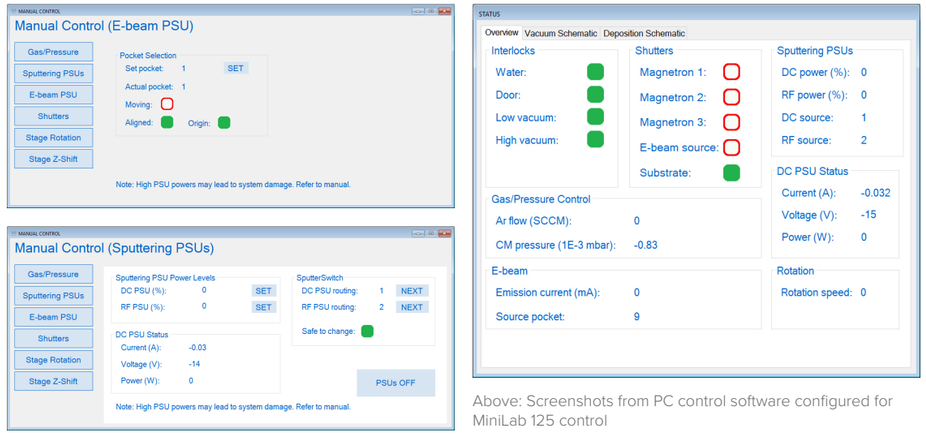
The MiniLab range consists of several platforms. Each platform is generally associated with a specific process chamber size. While all chambers are built to the same standards and allow for high-vacuum operation, larger chambers allow for more techniques and flexibility than their smaller counterparts. 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 125 platform:

MiniLab 125 systems are floor-standing vacuum evaporators for metal, dielectric and/or organics thin-film deposition. All systems contain a box-type stainless-steel 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:

The unit is fitted with high-stability, industrial-grade PLC electronics. 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



Above: Screenshots from PC control software configured for MiniLab 125 control

MiniLab 125 technical specifications:

Chamber
500 mm × 500 mm footprint, with optional depth (500 or 650 mm) subject to techniques. Box chamber with D-shaped back. Hinged front door for easy access. Chamber baseplate, top and sides fitted with ports for in-chamber hardware. Shuttered viewport(s) for process observation. Viton o-ring seals.

Safety interlocks
Water and vacuum levels.

Pumping group
Water-cooled Edwards or Leybold turbomolecular pumps, up to 1500 L/s. Cryogenic pumps also available. Edwards rotary or dry scroll-type backing pumps up to 35 m^3/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 controller
Industrial-grade, high-stability PLC electronics core. Designed for safe operation and reliable vacuum integrity.

Process 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.

Size
1700 mm (height) × 590 mm (depth) × 1180 mm (width); dependent on configuration.

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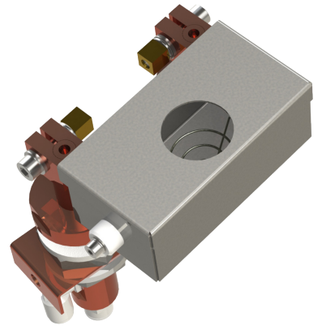
Configuration and options:

The MiniLab 125 base configuration includes a turbomolecular pump positioned on a port at the rear of the process chamber. The chamber sits on a double-rack frame that contains system control electronics and power supplies. MiniLab 125 systems are available with load-locks — please call for details.

The system can be equipped with a wide variety of deposition techniques. These include thermal and low-temperature evaporation sources (for metals and organics), magnetron sputtering cathodes (for metals and inorganics), and electron-beam sources (for most material classes except organics).



Moorfield TE1 source for standard thermal evaporation

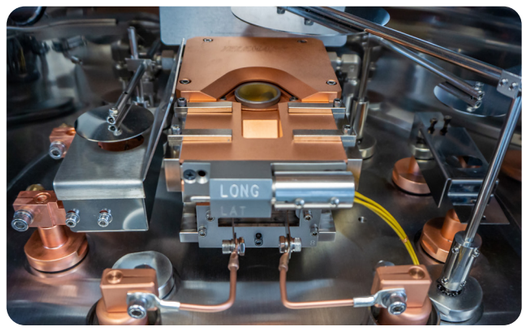
Thermal evaporation
Up to 4 thermal evaporation sources. Moorfield TE1, TE2, TE3 or TE4 configurations available. Water-cooled power feedthroughs and boxed shielding for excellent vacuum maintenance and low contamination. Power supplies available for automatic, manual, sequential- and co-deposition.

Moorfield LTE-1CC source for low-temperature evaporation

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.

Moorfield Flexi-Head MAGNETRON source for magnetron sputtering

Magnetron sputtering
Up to six 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.

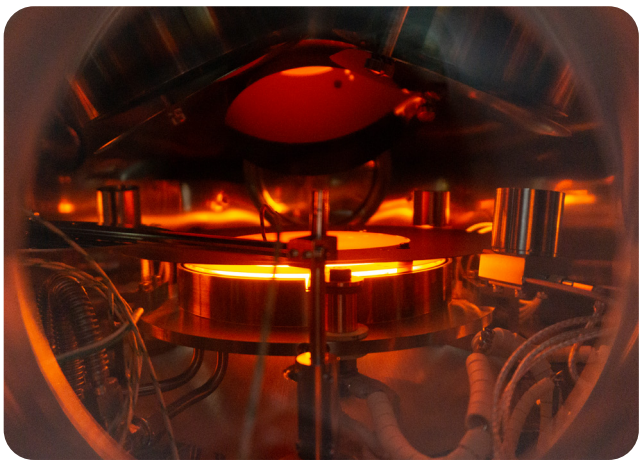


Telemark multi-pocket water-cooled electron-beam source

Electron-beam evaporation
Telemark multi-pocket (e.g., 6 × 7 CC or 8 × 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 125 systems. For all techniques, deposition rate monitoring (via quartz crystal sensor heads) together with thin-film monitors and controllers are available.

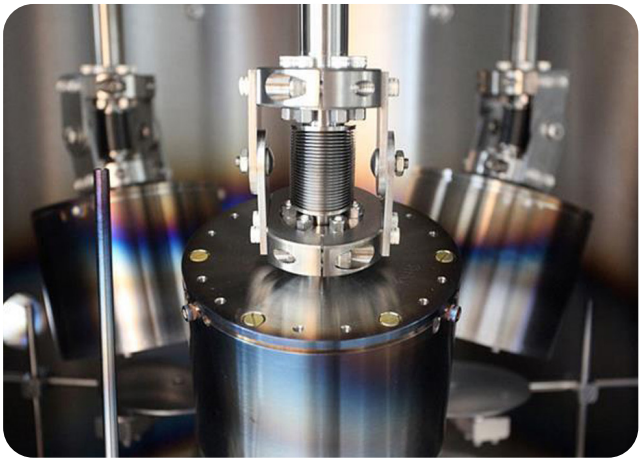
PRODUCT INFORMATION



Heater stage seen through the MiniLab 125's chamber viewport

Minilab 125 chamber roof, with removable top-plate allowing for future re-configuration

Inserting substrates into a MiniLab 125 load-lock



Close-up of Moorfield magnetron sources in Minilab 125 system, for sputter-down operation and with flexible head angle and vertical position

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: N_2, 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

All images/descriptions in this brochure are indicative only; final appearance and design subject to your exact configuration.

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