

Q150T Automatic coating system specification

Work chamber: Size 150mm inside diameter x 127mm high borosilicate glass with integral implosion guard.

Touch screen user interface: Full graphical interface with touch screen buttons. Includes features such as a log of the last ten coatings carried out and reminders for when maintenance is due.

Specimen stage: Rotation with speed 8 ~ 20 rpm.

Vacuum system:
Turbo pump: Internally mounted 70L/s air-cooled turbomolecular pump.
Rotary pump: 50L/m two-stage rotary pump with oil mist filter (order separately: EK3180).

Vacuum measurement: Pirani gauge as standard. A full range gauge (product code 10428) is available as an option.

Typical ultimate vacuum: 5 x 10⁻³mbar.

Sputter vacuum range: Between 5 x 10⁻³ and 5 x 10⁻¹mbar.

Processes:
Sputtering: 0-150mA to a pre-determined thickness (with optional FTM) or by the built-in timer.
Carbon evaporation: A robust ripple free D.C. power supply featuring pulse evaporation ensures reproducible carbon evaporation from rod or fibre sources. Current pulse: 1-90 Amps.

Metal Evaporation and aperture cleaning head: For thermal evaporation of metals from filaments or boats. For cleaning SEM or TEM apertures a standard molybdenum boat can be fitted. The metal evaporation head is set up for downwards evaporation, but upward evaporation can be achieved by fitting two terminal extensions (supplied).

Services and other information:
Gases: Argon sputtering process gas, 99.999% (TS and TES versions). Nitrogen venting gas (optional).

Electrical supply: 90-250V ~ 50/60 Hz 1400 VA including rotary pump power. 110/240V voltage selectable.

Dimensions and weight: Instrument case: 585mm W x 470mm D x 410mm H (overall unit height: 650mm).

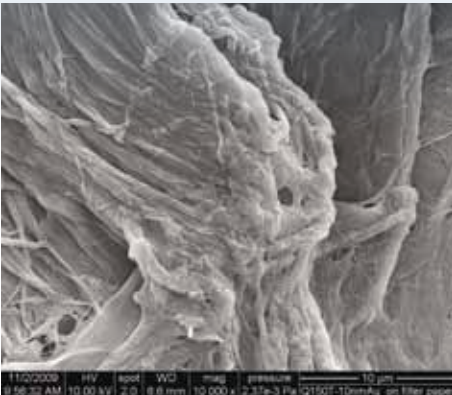
Total instrument weight: 33.4Kg.

Highlights and features:

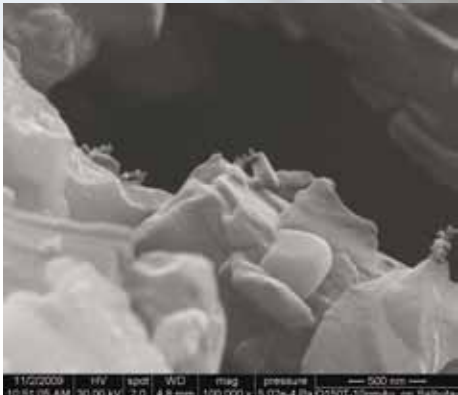
- Metal sputtering or carbon evaporation - or both – *all in one space saving design.*
- Fine grain sputtering – *for advanced high resolution FE – SEM applications.*
- High vacuum turbo pumping – *allows sputtering of a wide range of oxidising and non-oxidising metals – suitable for SEM, high resolution FE – SEM and thin film applications.*
- Fully automatic touch screen control – *rapid data input, simple operation.*
- Multiple, customer defined coating protocols can be stored – *ideal for multi-user laboratories.*
- Automatic vacuum control which can be pre-programmed to suit the process and material – *no needle valve to adjust.*
- Precise thickness control using the film thickness monitor option.
- “Intelligent” recognition of system – *automatically detects the type of coating insert fitted.*
- High vacuum carbon coating – *ideal for SEM and TEM carbon coating applications.*
- Advanced design carbon rod evaporation gun – *simple operation, reproducible results.*
- Control of evaporation current profile – *ensures consistently reproducible carbon films.*
- Easy-to-change, drop in style specimen stages (rotation stage as standard).
- Vacuum shut down feature – *leaves the process chamber under vacuum for improved vacuum performance.*
- Thick film capabilities – *up to 60 minutes sputtering time without breaking vacuum.*
- Ergonomic one piece moulded case – *easy maintenance and service access.*
- Ethernet with local FTP server connection – *simple programmer updates.*
- Three-year warranty.
- Power factor correction - *complies with current legislation (CE certification) and gives efficient use of power resulting in reduced running costs.*

Ordering information

PART NUMBER	DESCRIPTION
Q150T S	High resolution turbomolecular pumped sputter coater, including a TK8845 57mm diameter x 0.3mm chromium target.
Q150T E	Turbomolecular pumped carbon evaporator suitable for TEM and SEM applications. Fitted with a carbon rod evaporation head for 3.05mm diameter carbon rods. Supplied with carbon rods (C5422 3.05mm x 300mm) and a carbon rod shaper (manual operation).
Q150T ES	High resolution turbomolecular pumped sputter coater, including a TK8845 57mm diameter x 0.3mm chromium target and high vacuum carbon rod evaporation coater for 3.05mm diameter carbon rods.
EK3175	Edwards RV3 two-stage rotary pump, approximately 4m³/Hr, with vacuum hose, coupling kit and oil mist filter.
10456	Carbon rod evaporation insert for 6.15mm diameter rods.
10457	Metal evaporation and aperture insert, including the ability to evaporate upwards or downwards (TE and TES version only). Supplied with a pack of 10 tungsten filaments (A0754) and a molybdenum boat.
10453	Additional sputter insert for quick metal change (TE and TES version only).
10455	Carbon fibre evaporation insert. A quick release evaporation Insert. For evaporation of Carbon Fibre and Carbon Cord part No.s C5421 and C5461.
10360	Variable angle rotary planetary specimen stage (rotational speed 8-20 rpm).
10357	50mm diameter specimen stage with adjustable tilt up to 90 degrees.
10458	Flat rotation specimen stage for 4” wafers, includes gear box for increased coverage.
10358	Specimen stage for glass microscope slides (up to 2 x 75mm x 25mm slides).
10454	Film thickness monitor (FTM) attachment. Including oscillator, feed-through, quartz crystal holder and quartz crystals.
10428	Full range gauge for high vacuum measurement.
10429	Extended height vacuum chamber (214mm high – standard chamber is 127mm high) For increased source to sample distance and coating large samples.
10422	Vacuum spigot allows more convenient connection of the vacuum hose to the rear of the Q150T when bench depth is limited.



10nm Au on filter paper



10nm Au on Salbutamol



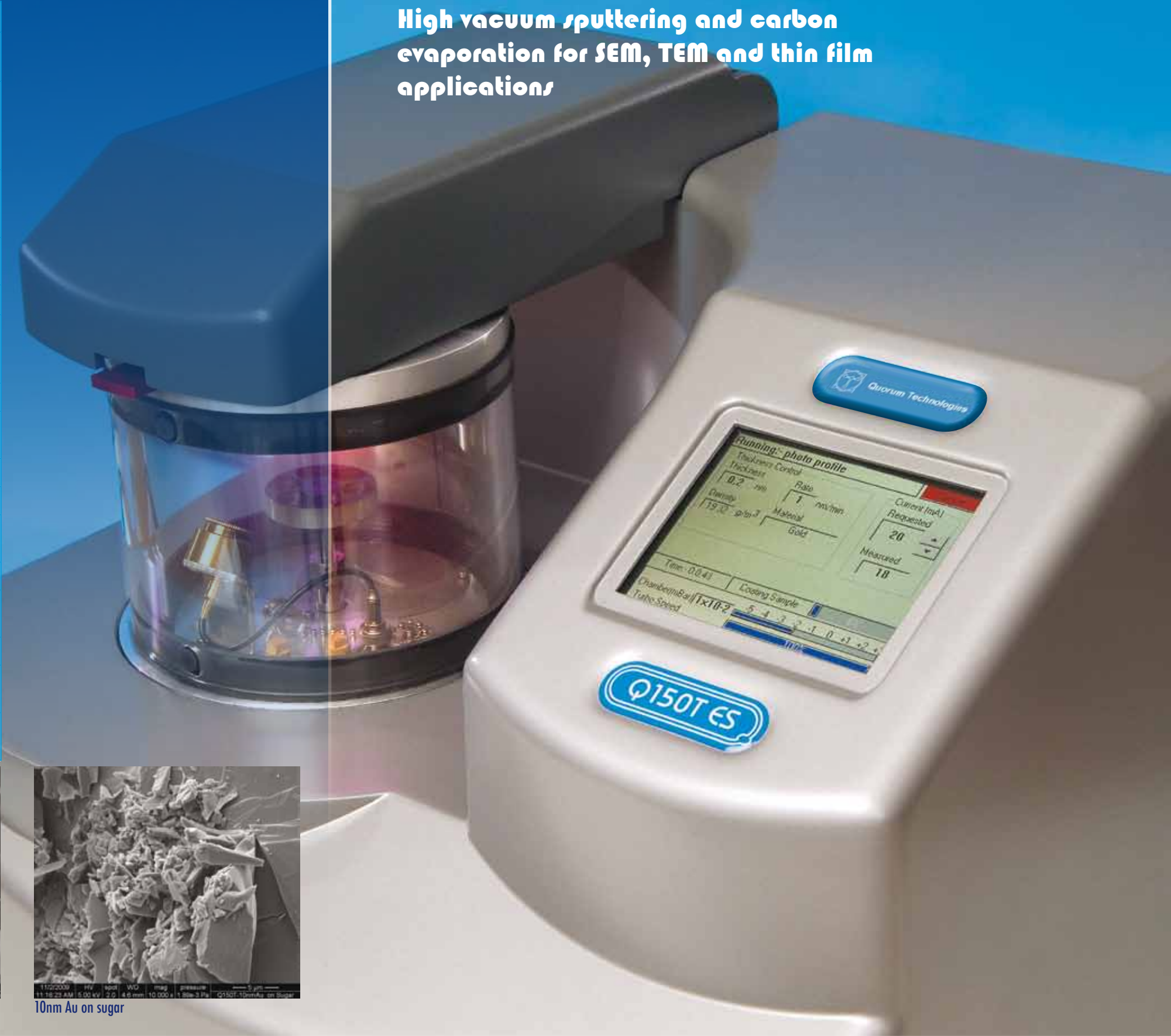
Quorum Technologies

Q150T Modular Coating Systems



Quorum Technologies

High vacuum sputtering and carbon evaporation for SEM, TEM and thin film applications



Q Series Turbo Pumped Coating Systems

Sputtering targets and carbon supplies:
The Q150S and Q150TES are supplied with chromium as standard, but a wide range of additional sputtering targets are available, including those widely used in SEM, such as Au, Au/Pd, Pt, Cr and Ir. For non-SEM applications target options include, Al, Ta, ITO, Fe, W, Ti, etc. Carbon accessories include high purity carbon rods and carbon fibre.
For further information please visit our website (www.quorumtech.com) or contact Quorum directly.

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Q150T series – turbo coaters

High performance fine grain coating suitable for FE-SEM applications

High vacuum performance

The **Q150T** is mounted in a robust, purpose built moulded case which houses all the working components, including the 70L/s air cooled turbomolecular pump. Automatic bleed control ensures optimum vacuum conditions during sputtering. The vacuum chamber is 165mm (6.5”) in diameter and comes with an integral implosion guard. The **Q150T** includes “vacuum shutdown” which enhances vacuum performance by allowing the chamber vacuum to be maintained when the system is not in use.

A rotary specimen stage is fitted as standard, with other stages available as options.

The **Q150T** is available in three formats:

- **Q150T S** – a high resolution sputter coater for oxidising and non-oxidising (noble) metals. A wide selection of sputtering targets are available, including iridium and chromium which are highly recommended for FE-SEM applications.
- **Q150T E** – a high vacuum carbon rod coater, ideal for the production of highly stable carbon films and surface replicas for transmission electron microscopy (TEM). 3.05mm diameter carbon rods as standard.
- **Q150T ES** – a combined system with both sputtering and carbon coating. The deposition inserts can be swapped in seconds and the intelligent system logic automatically recognises which insert is in place and displays the appropriate operating settings.

Each of the above can be fitted with a range of optional accessories (metal evaporation, carbon fibre coating, film thickness measurement etc). See “Option” sections for details.

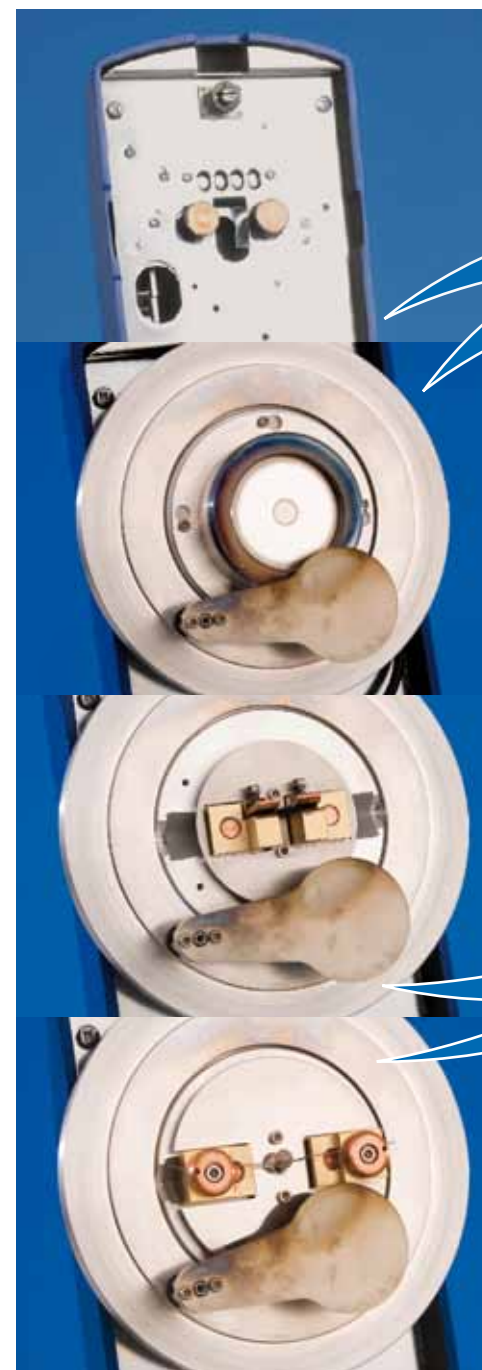
Touch screen control

At the operational heart of Q150T is a simple touch screen which allows even the most inexperienced or occasional operator to rapidly enter and store their own process data. To further aid ease of use a number of typical sputtering and evaporation profiles are already stored.

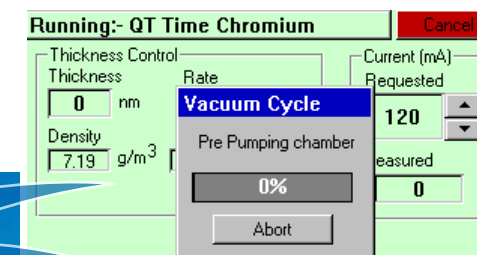
SEM and TEM coating comes of age with the fully automatic Q150T turbo pumped sputter / carbon coater

Based on an internally mounted 70 L/s turbomolecular pumping platform, the Q150T is available in three formats: sputtering, carbon evaporation or both. Presented in a state-of-the-art one-piece case, the colour touch-screen allows multiple users to input and store coating protocols.

Depending upon the selected configuration, the Q150T can be a top-of-the-range sputter coater for high resolution scanning electron microscopy (SEM), a carbon coater suitable for SEM and transmission electron microscopy (TEM), or both, in a single easy to use system. The ability of the Q150T to rapidly sputter a wide selection of oxidising and non-oxidising metals also makes it an ideal platform for many thin film applications.



Amorphous carbon replicas and TEM grid support films

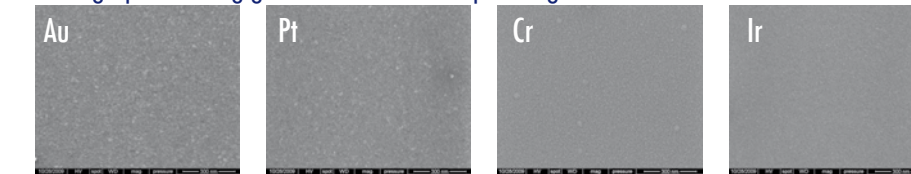


Coating insert options

A range of interchangeable, plug-in style coating inserts are available:

- Sputtering inserts suitable for oxidising and non-oxidising metals. Supplied with a 57mm diameter x 0.3mm thick chromium target as standard. For additional targets see “Ordering Information”.
- Additional sputter inserts available for quick coating material change (TS and TES versions only).
- Carbon rod evaporation insert (for 3.05mm diameter rods).
- Carbon rod evaporation insert (for 6.15mm diameter rods). Quorum recommends 3.05mm diameter rods as they offer greater process control and are more economical.
- Carbon fibre evaporation insert.
- Metal evaporation and aperture cleaning, including the ability to evaporate upwards or downwards (TE and TES versions only).

Micrographs showing grain size of different sputtering materials.



Specimen stage options

The Q150T has specimen stages to meet most requirements. All are easy-change, drop-in style (no screws) and are height adjustable (except rotary planetary stage):

- Rotation stage, 50mm in diameter (supplied as standard).
- Rotation stage with pre-set tilt angle.
- Variable angle rotary planetary stage.
- Flat rotation stage for 4” wafers.
- Glass microscope slide stage.

Other options

- Extended height chamber for tall specimens.
- Film thickness monitor (FTM).
- Full range vacuum gauge for low and high vacuum measurement (a Pirani gauge is fitted as standard).

