Q150R PLUS

Rotary Pumped Coater

SPUTTER AND EVAPORATION

The Q150R Plus is suitable for use with Tungsten/LaB$_6$ SEM and Benchtop SEM.

Sputter coating of noble metals using the Q150R S & ES Plus:

Recommended for magnifications:
- up to x 50k using Au, Au/Pd
- up to x 100k using Pt (optional)

Carbon cord coating for elemental analysis using the Q150R E & ES Plus.

Recommended applications:

- Low and medium magnifications
- SE signal boost (1nm or less)
- Table-top SEM coating
- Elemental analysis
- Copper metallisation layers

Q150R Plus features

New user interface has been thoroughly updated:

- **Capacitive touch screen is more sensitive for ease of use**
- **User interface software has been extensively revised, using a modern smartphone-style interface**
- **Comprehensive context-sensitive help screen**
- **USB interface allows easy software updates and backing up/copying of recipe files to USB stick**
- **Process log files can be exported via USB port in .csv format for analysis in Excel or similar. Log files include date, time and process parameters.**
- **16GB of flash memory can store more than 1000 recipes**
- **Dual-core ARM processor for a fast, responsive display**

Allows multiple users to input and store coating recipes, with a new feature to sort recipes per user according to recent use.

Intelligent system logic automatically detects which insert is in place and displays the appropriate operating settings and controls for that process.

System prompts user to confirm target material and it then automatically selects appropriate parameters for that material.

Intuitive software allows the most inexperienced or occasional operator to rapidly enter and store their own process data. For convenience a number of typical sputtering and carbon coating profiles are already stored but also allows the user to create their own.

Software detects failure to achieve vacuum in a set period of time and shuts down the process in case of vacuum leak, which ensures pump protection from overheating.

Ladybird larvae hair coated 10nm Au mag x 2.5K

The Q150R Plus is available in three configurations:
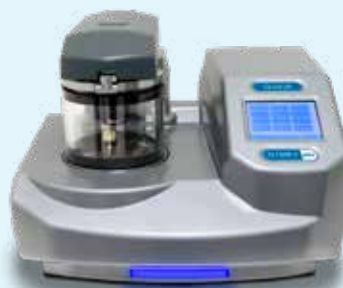
Q150R S PLUS

An automatic sputter coater for non-oxidising metals

Available sputtering targets including gold, gold-palladium and platinum.

Q150R E PLUS

An automatic carbon cord coater for SEM applications such as EDS and WDS.

Q150R ES PLUS

A combined system capable of both sputtering and carbon coating

The deposition head inserts can be swapped in seconds.

The Q150R Plus is part of Quorum Technologies internationally acclaimed Q series of coaters, used by thousands of customers worldwide. Designed to provide high-quality coating solutions for SEM, TEM and thin-film applications, the Q series is versatile, affordable and easy to use. **These products are for Research Use Only. .**

Automatic, controlled pulsed carbon cord evaporation

The carbon evaporation process can be terminated using the optional film thickness monitor, which incorporates a quartz crystal monitor, fitted as standard on E and ES models. This recipe ensures that carbon is evaporated in short controlled pulses, which has two effects; protecting the sample from heating and ensuring the accuracy of the film thickness monitor. Pulsing also significantly reduces the amount of debris (including large carbon fragments) associated with traditional carbon "flash" evaporation. Pulsed and ramped carbon rod recipes are supplied as standard.
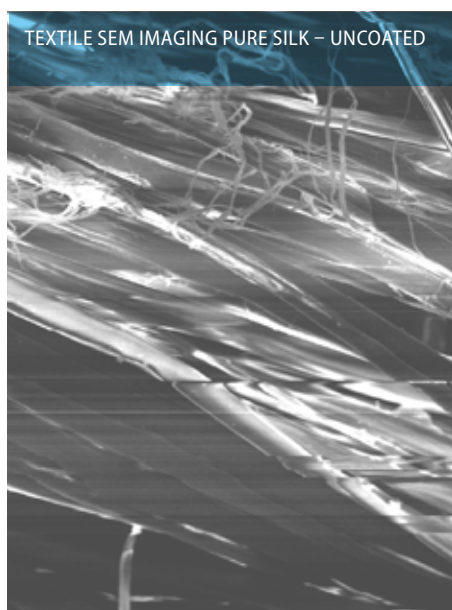
Cool Magnetron Sputtering

Sputter coating is a technique widely used in various applications; it is possible to create a plasma and sputter metals with high voltage, poor vacuum and no automation. However, this is not suitable for electron microscopy applications because it will heat the sample and can result in damage when the plasma interacts with the sample. The Q series uses low temperature enhanced-plasma magnetrons optimised for the rotary pump pressures, combined with low current and deposition control, which ensures your sample is protected and uniformly coated.

The Q150R S Plus and Q150R ES Plus use easy-change, 57 mm diameter, disc-style targets which are designed to sputter non-oxidising (noble) metals – ideal for W-SEM applications. The Q150R S Plus and Q150R ES Plus are fitted as standard with a gold (Au) sputter target.

Other targets options include; Au/Pd, Pt/Pd, Pd, and Cu. Platinum (Pt) can also be sputtered with the optional Pt coating vacuum hose assembly.

NEW INTUITIVE TOUCH & SWIPE SCREEN

NEW VISUAL STATUS INDICATOR

Q150R Plus comparative performance:

TEXTILE SEM IMAGING PURE SILK – UNCOATED

PURE SILK COATED 10NM AU

X 0.9K MAG

X 0.3K MAG

PURE SILK COATED 10NM AU MAG X 18K

Textiles charge extensively when subjected to electron beam, this results in artefacts in images.
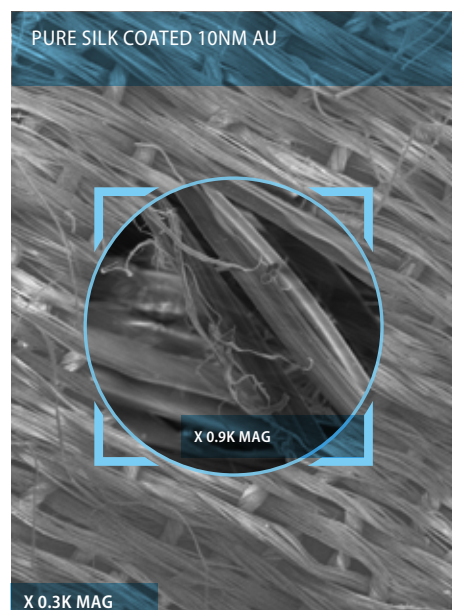
Coating with Au improves contrast, prevents charging and emerging artefacts.
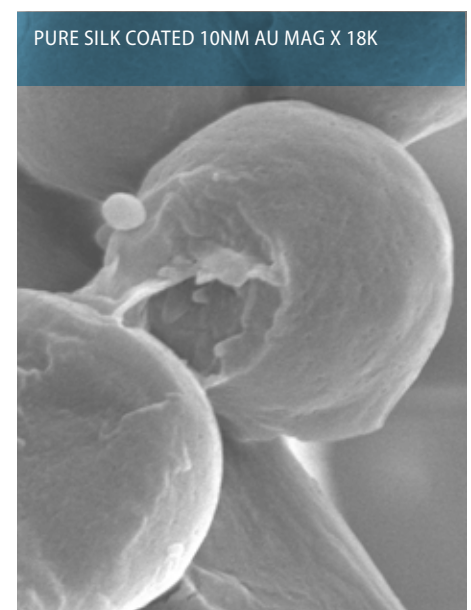
Despite the coating, the impurities on the silk fibres are clearly visible.

Q150R Plus features

Interchangeable plug-in heads

This allows the user to configure the system as a sputter coater, evaporator or glow discharge system - all in one space saving format. A carbon cord evaporation insert is available as an option. Automatic detection of the head type when changed.

Detachable chamber with built-in implosion guard

Removable glass chamber and easily accessible base and top plate allows for an easy cleaning process.

Users can rapidly change the chamber, if necessary, to avoid cross contamination of sensitive samples.

Tall chamber option is available for carbon evaporation to avoid sample heating, to improve uniformity for sputtering and to hold taller samples.

Multiple stage options

The Q150R Plus has specimen stages to meet most requirements. All are easy-change, drop-in style (no screws) and are height adjustable (except for the rotary planetary stage). Some examples:

- **Rotation stage (supplied as standard): 50 mm Ø can accommodate six standard stubs. Height can be pre-set.**
- **Rotate-tilt stage for improved uniform coating: 50 mm Ø. Tilt and height can be pre-set.**
- **Variable angle, rotary planetary stage for heavily contoured samples**
- **Large flat rotation stage with offset gear box for 4"/100 mm wafers**
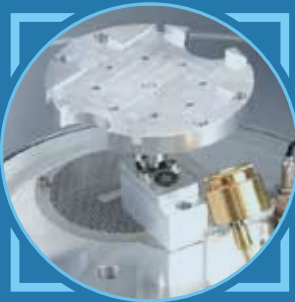- **Rotation stage for glass microscope slides**

*Other options are available on request.*

Safety

The Q150R Plus meets key industry CE standards

- **All electronic components are protected by covers**
- **Implosion guard prevents user injury in event of chamber failure**
- **Vacuum interlocks remove power from deposition sources to prevent user exposure to high voltage in event of chamber being opened**
- **Electrical interlocks remove power when source head cover opened**
- **Overheating protection shuts down power supply**

Examples of stages, shown with optional FTM

Microscope slide stage
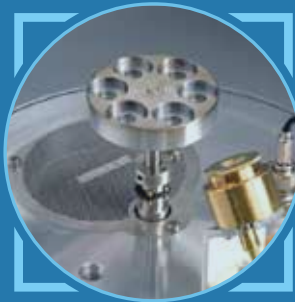
Rotation stage

Wafer stage

Rotacota planetary stage

Specifications

Instrument case

585 mm W x 535 mm D x 410 mm H
(total height with coating head open: 650 mm)

Weight

28 kg (packed: 42 kg)

Packed dimensions

725 mm W x 660 mm D x 680 mm H

Work chamber

Borosilicate glass 150 mm ID x 127 mm H

Display

115.5mm W x 86.4mm H (active area), 640 RGB x 480 (display format), capacitive touch colour display

User interface

Full graphical interface with touch screen buttons, includes features such as a log of the last 1000 coatings and reminders for when maintenance is due

Sputter target

Disc-style 57 mm Ø. 0.1 mm thick gold (Au) target is fitted as standard. R S and R ES versions only

Specimen stage

50 mm Ø rotation stage with rotation speed of 8-20 rpm.
Other stages available on request.

Vacuum

Rotary pump: optional 5 m³/hr two-stage rotary pump with oil mist filter (order separately)

Vacuum measurement: Pirani gauge

Ultimate vacuum: 2×10^{-3} mbar*

Sputter vacuum range: Between 7×10^{-3} and 1×10^{-1} mbar for gold

Typical ultimate vacuum of the pumping system in a clean instrument after pre-pumping with dry nitrogen gas

Processes

Sputtering: Sputter current 0-80 mA to a predetermined thickness (with optional FTM) or by the built-in timer. The maximum sputtering time is 60 minutes (without breaking vacuum and with automatically built-in cooling periods)

Carbon evaporation: A robust, ripple free DC power supply featuring pulse evaporation ensures reproducible carbon evaporation from cord sources. Current pulse: 1-70 A current.

Visual status indicator

A large multi-colour status indicator light provides a visual indication of the state of the equipment, allowing users to easily identify the status of a process at a distance.

The indicator LED shows the following states:

- Initialisation
- Process running
- Idle
- Coating in progress
- Process completed
- Process ended in fault condition

Audio indication also sounds on completion of the process.

Quorum