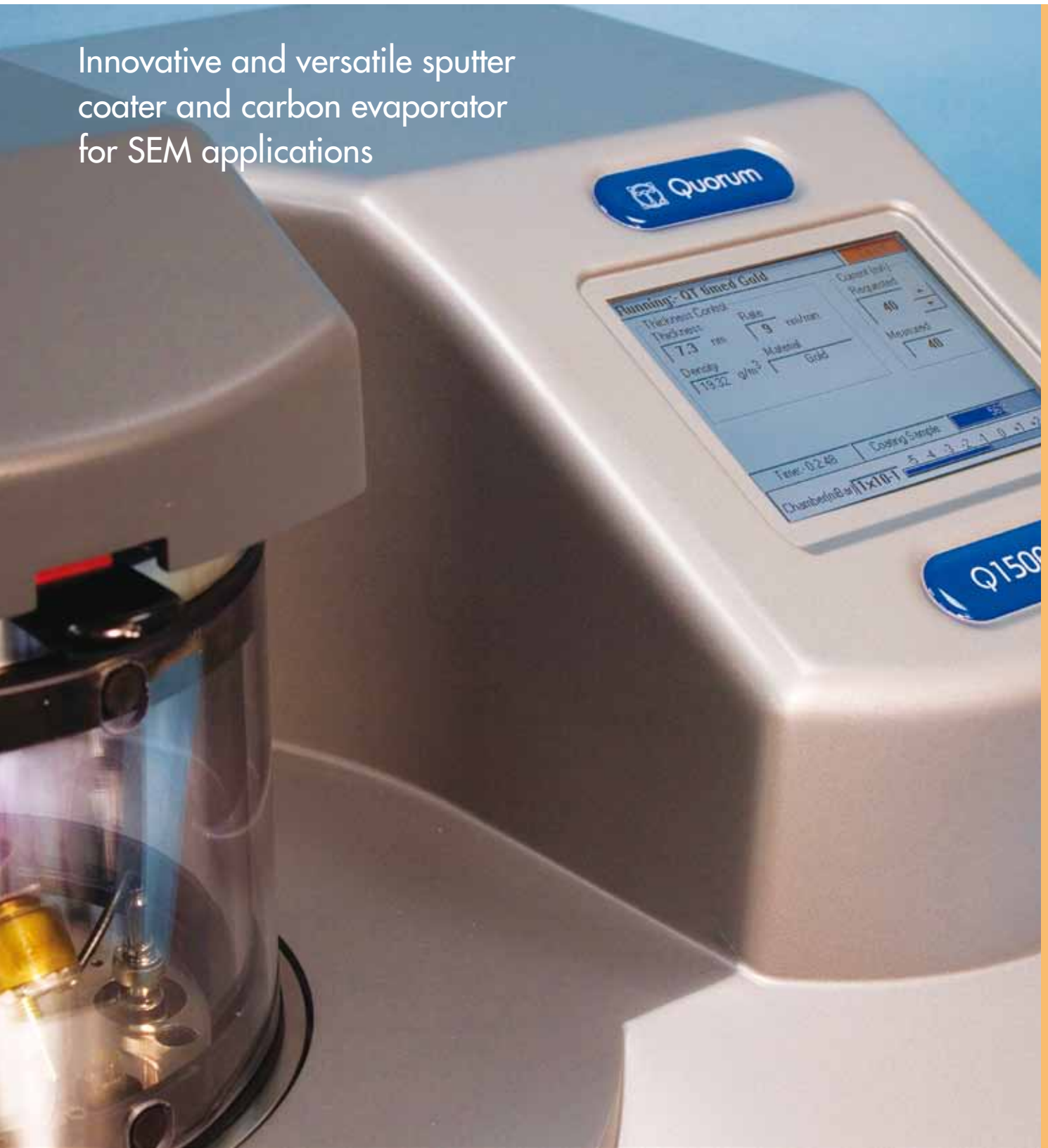




Quorum Technologies

# Q150R Modular Coating Systems

Innovative and versatile sputter coater and carbon evaporator for SEM applications



Q Series Rotary Pumped Coating Systems

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# Q150R Series – Rotary Pumped Coaters

The Q150R is a versatile and compact rotary pumped coating system, ideally suited for scanning electron microscopy (SEM) specimen preparation and other coating applications. The 165mm/6.5" diameter chamber can accommodate a wide range of specimens which require conductive coatings - typically used to enhance imaging in SEM applications. The innovative design is available in the following configurations, all of which are comprehensively covered by our three year warranty programme:



## Q150R S

Rotary pumped sputter coater, suitable for coating specimens with non-oxidising (noble) metals, such as gold, silver, platinum and palladium.

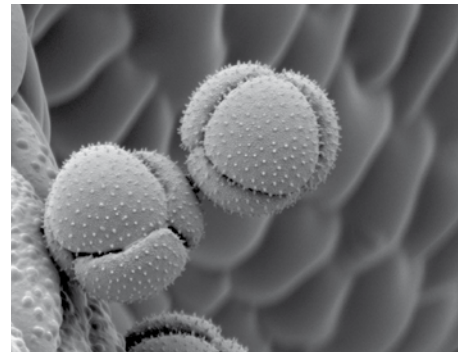
## Q150R E

Rotary pumped carbon coater, which uses carbon fibre or carbon cord to coat SEM specimens.

## Q150R ES

Combines capabilities of both the Q150R S and Q150R E in one space-saving platform. The dual purpose, compact, rotary pumped system is supplied with a sputtering and carbon fibre evaporation inserts - offering unequalled versatility of use.

Additionally, a glow discharge option is available (S and ES versions only) to allow modification of specimen surface properties (e.g. hydrophobic to hydrophilic conversion).



## Speed and simplicity

- Quick, easy-to-change coating inserts enable rapid conversion between metal sputtering, carbon evaporation or glow discharge in one space saving design.
- Data is rapidly entered using fully automatic touch screen control. Coating protocols to suit the process and material can be pre-set and stored at the touch of a button.
- Automatic bleed control ensures optimum vacuum conditions during sputtering, offering consistency and repeatability.

## Ease of use

- The intelligent recognition system automatically detects which type of coating insert is fitted, allowing instant operation of relevant coating protocols.
- Multiple, customer defined coating protocols can be stored – ideal for multi-user laboratories where different applications require changes in coating parameters.
- Stage modules to suit a wide range of size and type of specimen; all feature a quick, easy-to-change, drop-in style.

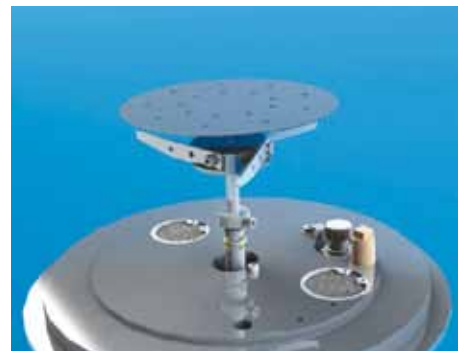


## Robust, reproducible and reliable

- Pre-programmable parameters and protocols ensure consistent and reliable results. Where thick film deposition is required, the system offers up to 60 minutes sputtering time without breaking vacuum.
- The advanced design carbon evaporation insert is simple to operate and, with full control of evaporation current parameters, ensures consistently reproducible carbon deposition for SEM applications. An optional film thickness monitor allows for repeatable thickness control.

## Adaptable and versatile

- Sputtering, carbon evaporation and glow discharge inserts and options, make the Q150R ideal for multi-user laboratories.
- A range of non-oxidising metals, such as gold, silver, platinum and palladium can be sputtered. The carbon fibre coating insert allows a very high throughput of specimens.
- A carbon rod evaporation option is also available.



# Q150R S Sputter Coater

The Q150R S is a compact, bench mounted, rotary pumped sputter coater, suitable for depositing thin, fine grain layers of non-oxidising (noble) metals. A selection of sputtering targets is available for SEM applications.

*(For deposition of oxidising metals please refer to model Q150T).*

The Q150R S sputtering insert is fitted with a magnetron system which deflects high energy electrons generated during the sputtering process away from the specimens. This helps to create the cool sputtering conditions needed to eliminate thermal effects and to ensure fine grain structure within the sputtered films – an essential requirement for SEM applications.

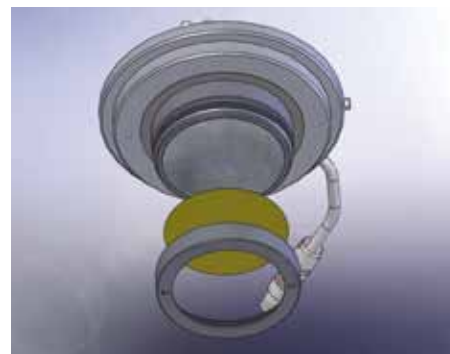
## Rotary pumped sputter coating

The Q150R S allows sputtering of a range of non-oxidising (noble) metals. The system is fitted with a gold target as standard, but other metals, such as gold, silver, platinum, palladium and alloys of gold/palladium and platinum/palladium are available.

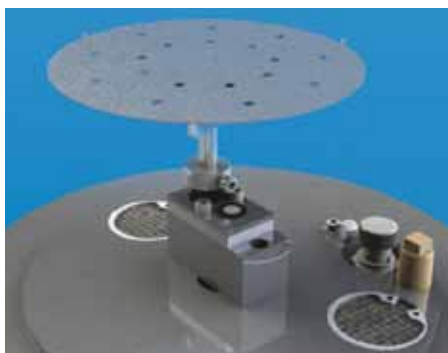
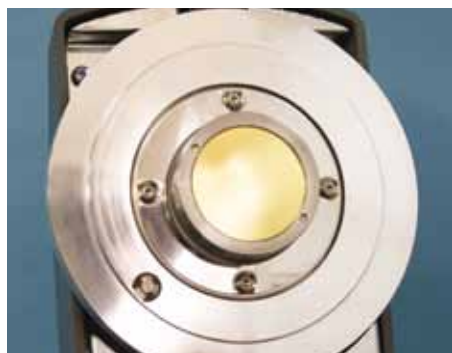
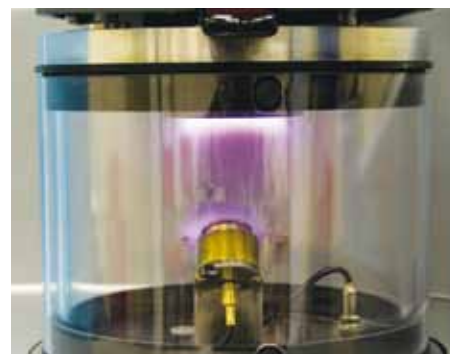
## Glow discharge option (pictured right)

A quick, easy-to-change glow discharge insert is available for modification of specimen surface properties (e.g. hydrophobic to hydrophilic conversion).

*For full details of options and accessories, see Additional Ordering Information section.*



Q150R S Ordering Information	
10417	Q150R S rotary pumped sputter coater
Includes:	10587 quick-release sputter insert suitable for non-oxidising (noble) metals. Supplied with an SC502-314A gold target
	10067 rotation stage, 50mm Ø with adjustable height for target to specimen distances of 38mm-79mm (supplied with two mounting pillars). Note: this stage does not tilt
Rotary pump required for operation – order separately	
EK3175	Edwards RV3 50L/s two-stage rotary pump, with vacuum hose, coupling kit and oil mist filter
EK3171	XDS5 scroll pump (oil free alternative to EK3175 if required)



Three-year warranty

# Q150R E Carbon Evaporator

The Q150R E is a compact, bench mounted, rotary pumped carbon coater, suitable for thermally evaporating thin conductive layers of carbon for scanning electron microscopy applications, e.g. energy dispersive x-ray spectroscopy (EDS) and wavelength dispersive x-ray spectrometry (WDS). The system uses carbon fibre or carbon cord as standard.

*(For transmission electron microscopy (TEM) applications, such as the production of carbon support films and surface replicas, please refer to model Q150T).*

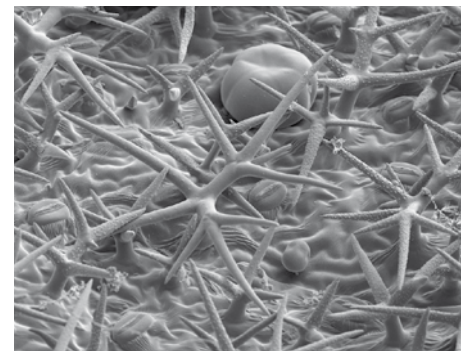
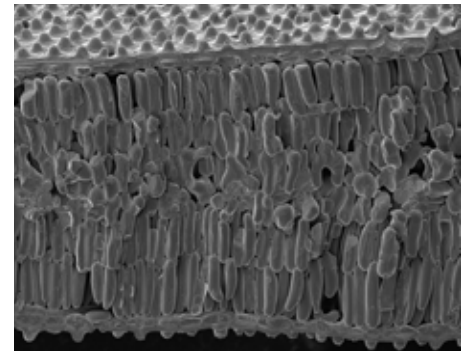
## Reproducible carbon deposition

A robust, ripple free D.C. power supply with controllable evaporation current ensures reproducible carbon coatings. An automatic source shutter protects specimens during the "out-gassing" phase of the coating cycle.

## Carbon rod evaporation option

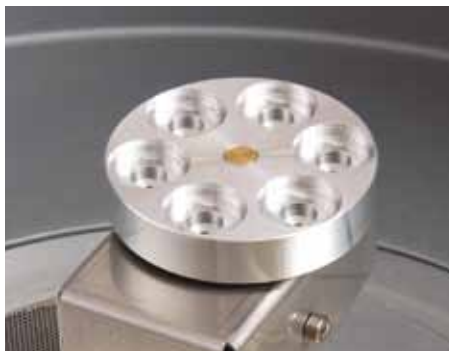
A quick, easy-to-change insert for evaporation of 3.05mm diameter carbon rods (10879) is available as an option, where a slower more controllable evaporative process is required.

*For full details of options and accessories, see Additional Ordering Information section.*



## Q150R E Ordering Information

10419	Q150R E rotary pumped carbon fibre evaporator
Includes:	10355 quick-release carbon fibre evaporation insert suitable for evaporation of carbon fibre and carbon cord. Supplied with C5421 carbon fibre cord (1 metre length)
	10067 rotation stage, 50mm Ø with adjustable height for target to specimen distances of 38mm-79mm (supplied with two mounting pillars). Note: this stage does not tilt
Rotary pump required for operation – order separately	
EK3175	Edwards RV3 50L/s two-stage rotary pump, with vacuum hose, coupling kit and oil mist filter
EK3171	XDS5 scroll pump (oil free alternative to EK3175 if required)



# Q150R ES Dual Sputtering and Evaporation System

The Q150R ES combines both sputtering of noble metals and thermal evaporation of carbon fibre capabilities into a single, compact, easy-to-use system. The coating inserts can be swapped in seconds and the intelligent system logic automatically recognises which insert is in place and displays the appropriate operating settings.

## Sputtering and evaporation

An interchangeable sputtering insert and a carbon fibre evaporation insert are supplied as standard, giving both capabilities in one system.

## Magnetron sputtering insert

The Q150R S sputtering insert is fitted with a magnetron system, which deflects high energy electrons generated during the sputtering process away from the specimens, eliminating thermal effects and ensuring fine grain structure within the sputtered films.

## Rotary pumped sputter coating

The system is fitted with a gold target as standard, but other non-oxidising (noble) metals, such as platinum, silver, palladium and alloys of gold/palladium and platinum/palladium are available.

## Reproducible carbon deposition

A robust, ripple free D.C. power supply with controllable evaporation current ensures reproducible carbon coatings. An automatic source shutter protects specimens during the "out-gassing" phase of the coating cycle.

## Carbon rod evaporation option

A quick, easy-to-change insert for evaporation of 3.05mm diameter carbon rods (10879) is available as an option, where a slower more controllable evaporative process is required.

## Glow discharge option (illustrated below right)

A quick, easy-to-change glow discharge insert is available for modification of specimen surface properties (e.g. hydrophobic to hydrophilic conversion).

For full details of options and accessories, see *Additional Ordering Information* section.

## Q150R ES Ordering Information

10418	Q150R ES rotary pumped dual sputtering and evaporation system
Includes:	10587 quick-release sputter insert suitable for non-oxidising (noble) metals. Supplied with SC502-314A gold target
	10355 quick-release carbon fibre evaporation insert suitable for evaporation of carbon fibre and carbon cord. Supplied with C5421 carbon fibre cord
	10067 rotation stage, 50mm Ø with adjustable height for target to specimen distances of 38mm-79mm (supplied with two mounting pillars). Note: this stage does not tilt
Rotary pump required for operation – order separately	
EK3175	Edwards RV3 50L/s two-stage rotary pump, with vacuum hose, coupling kit and oil mist filter
EK3171	XDS5 Scroll pump (oil free alternative to EK3175 if required)



Three-year warranty

# Additional Ordering Information

Coating inserts, stages and other options:			
Options and accessories	10726	Additional sputter insert for quick metal change (R S and R ES only). Note: this is an entire sputtering assembly; individual noble metal targets can also be purchased	
	10879	Carbon rod evaporation insert for 3.05mm Ø rods (R E and R ES only). Includes S8651 manual rod shaper and C5422 carbon rods	
	10262	Glow discharge insert to modify surface properties (e.g. hydrophobic to hydrophilic conversion). Can be retrofitted (R S and R ES only)	
	10068	Additional standard glass chamber assembly (includes implosion guard)	
	10429	Extended height vacuum chamber (214mm high – the standard chamber is 127mm high). Includes implosion guard. For increased source to specimen distance and for carbon coating large specimens	
	10731	Rotating vacuum spigot. Allows a more convenient connection of the vacuum hose to the rear of the Q150R when bench depth is limited	
	10454	Film thickness monitor (FTM) attachment	
		Consists of a built-in chamber mounted quartz crystal oscillator (includes crystal). As sputtered or evaporated material is deposited onto the crystal, so its frequency of oscillation is modified. This modification is used to measure and control the thickness of material deposited	
	C5460	Spare quartz crystal	
Specimen stages	The Q150R has alternative specimen stages to meet most requirements. All are easy-change, drop-in style and are height adjustable (except 10360 rotary planetary stage)		
	10357	50mm Ø rotate-tilt specimen stage with adjustable tilt (up to 90 degrees) and height (37mm-60mm). Has six positions for 15mm or 6.5mm or 1/8" pin stubs. Stage rotation speed variable between 8 and 20rpm	
	10358	90mm Ø rotating specimen stage for glass microscope slides (up to two x 75mm x 25mm slides). Stage rotation speed variable between 8 and 20rpm	
	10360	Variable angle "Rotacota" rotary planetary stage with 50mm Ø specimen platform. Has six positions for 15mm or 6.5mm or 1/8" pin stubs. Stage rotation speed variable between 8 and 20rpm	
	10458	Flat rotation specimen stage for 100mm/4" wafers, includes gearbox for increased coverage. Stage rotation speed variable between 8 and 20rpm	
Spares kits	10730	Two-year spares kit for Q150R S	
		Includes: SC502-314A 57mm Ø x 0.1mm gold target, standard glass chamber assembly, C5460 quartz crystals, O-rings etc	
	10729	Two-year spares kit for Q150R E	
		Includes: C5421/C5461 carbon fibre/cord (x1m), standard glass chamber assembly, C5460 quartz crystals (x3), O-rings, springs etc	
	10728	Two-year spares kit for Q150R ES	
		Includes: SC502-314A 57mm Ø x 0.1mm gold target, C5421/C5461 carbon fibre/cord (x1m), standard glass chamber assembly, C5460 quartz crystals (x3), O-rings, springs etc	

# Additional Ordering Information

Sputtering targets and carbon supplies:		
Sputtering targets	SC502-314A	57mm Ø x 0.1mm gold
	SC502-314A/0.2mm	57mm Ø x 0.2mm gold
	TK8889	57mm Ø x 0.3mm gold
	SC502-314B	57mm Ø x 0.1mm gold/palladium (80/20%)
	SC502-314B/0.2mm	57mm Ø x 0.2mm gold/palladium (80/20%)
	TK8891	57mm Ø x 0.3mm gold/palladium (80/20%)
	SC502-314C	57mm Ø x 0.1mm platinum
	SC502-314C/0.2mm	57mm Ø x 0.2mm platinum
	TK8893	57mm Ø x 0.3mm platinum
	SC502-314D	57mm Ø x 0.1mm nickel
	SC502-314E	57mm Ø x 0.1mm silver
	SC502-314G	57mm Ø x 0.1mm palladium
	SC502-314H	57mm Ø x 0.1mm copper
	TK8878	57mm Ø x 0.1mm platinum/palladium (80/20%)
	TK8887	57mm Ø x 0.3mm platinum/palladium (80/20%)
	Carbon supplies	A0819
A0819-5		Carbon fibre cord – high purity – 5m
C5421		Carbon fibre cord – standard grade – 1m
C5421-10		Carbon fibre cord – standard grade – 10m
C5421-100		Carbon fibre cord – standard grade – 100m
C5461		Carbon fibre – fine strands – 1m
C5461-10		Carbon fibre – fine strands – 10m
C5461-100		Carbon fibre – fine strands – 100m
C5422		Carbon rods 3.05mm Ø x 300mm length (unshaped) pack of 10
S8651		Manual rod shaper for 3.05mm Ø carbon rods

## Choosing a sputtering target or carbon source

**Gold** – most commonly used metal for routine SEM applications; it is quick to sputter and has the most effective electrical conduction characteristics.

**Silver** – is highly conductive and has a high secondary electron coefficient. Sputtered silver can easily be removed enabling specimens to be returned to their original state after imaging.

**Platinum** – offers the smallest grain size in rotary-pumped systems and is a good secondary electron emitter.

**Palladium** – is particularly good for x-ray analysis as the spectra conflicts are relatively low.

**Gold/palladium (80:20%)** – the palladium enhances ultimate resolution performance by restricting agglomeration of gold during deposition.

**Carbon fibre coating** – the “flash” evaporation nature of the carbon fibre coating process and the ability to replace fibre rapidly results in a very high throughput of specimens.

**Carbon rod evaporation** – involves a slower more controllable evaporative process, resulting in more homogenous carbon films.

**Q150R Automatic Coating System Specification**

General	Instrument case	585mm W x 470mm D x 410mm H (total height with coating head open: 650mm)
	Weight	28.4kg
	Packed dimensions	725mm W x 660mm D x 680mm H (36.8kg)
	Work chamber	Borosilicate glass 152mm Ø (inside) x 127mm H
	Safety shield	Integral polyethylene terephthalate (PET) cylinder
	Display	145mm 320 x 240 colour graphic thin film transistor (TFT) display
	User Interface	Intuitive full graphical interface with touch screen buttons, includes features such as reminders for when maintenance is due and a log of the last ten coatings carried out
	Sputtering target	Disc style 57mm Ø. A 0.1mm thick gold target is fitted as standard. Q150R S and Q150R ES versions only
	Specimen stage	50mm Ø rotating stage with six stub positions for 15mm, 10mm, 6.5mm or 1/8" pin stubs. Rotation speed 8-20 rpm
Vacuum	Rotary pump	Edwards RV3 50L/s two-stage rotary pump, with vacuum hose, coupling kit and oil mist filter (Order separately: EK3175)  If oil-free pumping is required, an XDS5 scroll pump can be used. (Order separately: EK3171)
	Vacuum measurement	Pirani gauge fitted as standard
	Typical ultimate vacuum	$2 \times 10^{-2}$ mbar
	Sputter vacuum range	Between $3 \times 10^{-2}$ and $5 \times 10^{-1}$ mbar
Processes	Sputtering	0-80mA to a pre-determined 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 rest periods)
	Carbon evaporation	A robust, ripple free D.C. power supply featuring pulse evaporation ensures reproducible carbon evaporation from fibre, cord or rod sources. Current pulse for carbon cord: 1-60 Amps; current pulse for carbon rods with spigot size of 1.4mm Ø: 1-90 Amps
	Glow discharge	Operates at 100mA in DC+ mode and at 30mA in DC- mode
Services and other information	Gases	Argon sputtering process gas, 99.999% (R S and R ES versions). Nitrogen venting gas (optional)
	Electrical supply	90-250V ~ 50/60 Hz 1400 VA including RV3 rotary pump power. 110/240V voltage selectable
	Conformity	CE conformity
	Power factor correction	Complies with the current legislation (CE Certification) and ensures efficient use of power which means reduced running costs

For further information on all products in the range, please visit our website [www.quorumtech.com](http://www.quorumtech.com) or contact:

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