Quorum

COATING SOLUTIONS

Q300T D PLUS

Dual target sequential sputtering for specimens up to 150 mm diameter

SPUTTER AND EVAPORATION

Suitable for multi-layer sequential sputtering of two materials, the Q300T D Plus has two independent sputtering heads, which allows sequential sputtering of two metals without the need to break vacuum. The system is fully automated with user defined recipes controlling the pumping sequence, time, number of sputter cycles, and the current used during the process. Unlimited layers of varying thickness from two target materials can be sputtered sequentially by cycling between both targets. When not in use the targets are shuttered for protection from contamination.

Substrates can be coated using non-oxidising (noble) metals such as gold (Au) and platinum (Pt). For coatings with a fine grain structure iridium (Ir) can also be used. With the high-quality vacuum system the Q300T D Plus is also capable of using oxidising metal targets such as chromium (Cr) and aluminium (Al) to produce fine films and coatings. The Q300T D Plus comes as standard with a chromium (Cr) target and gold (Au) target.

Recommended applications:

- Ideal for multi-layer coating
- Adhesion studies

Q300T D Plus features

New user interface has been thoroughly updated:

- **Dual-core ARM processor for a fast, responsive display**
- **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**
- **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**
- **Quick and easy creation of process sequences with a simple copy, drag and drop operation**

Allows multiple users to input and store coating recipes. New feature to sort recipes per user according to recent use.

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.

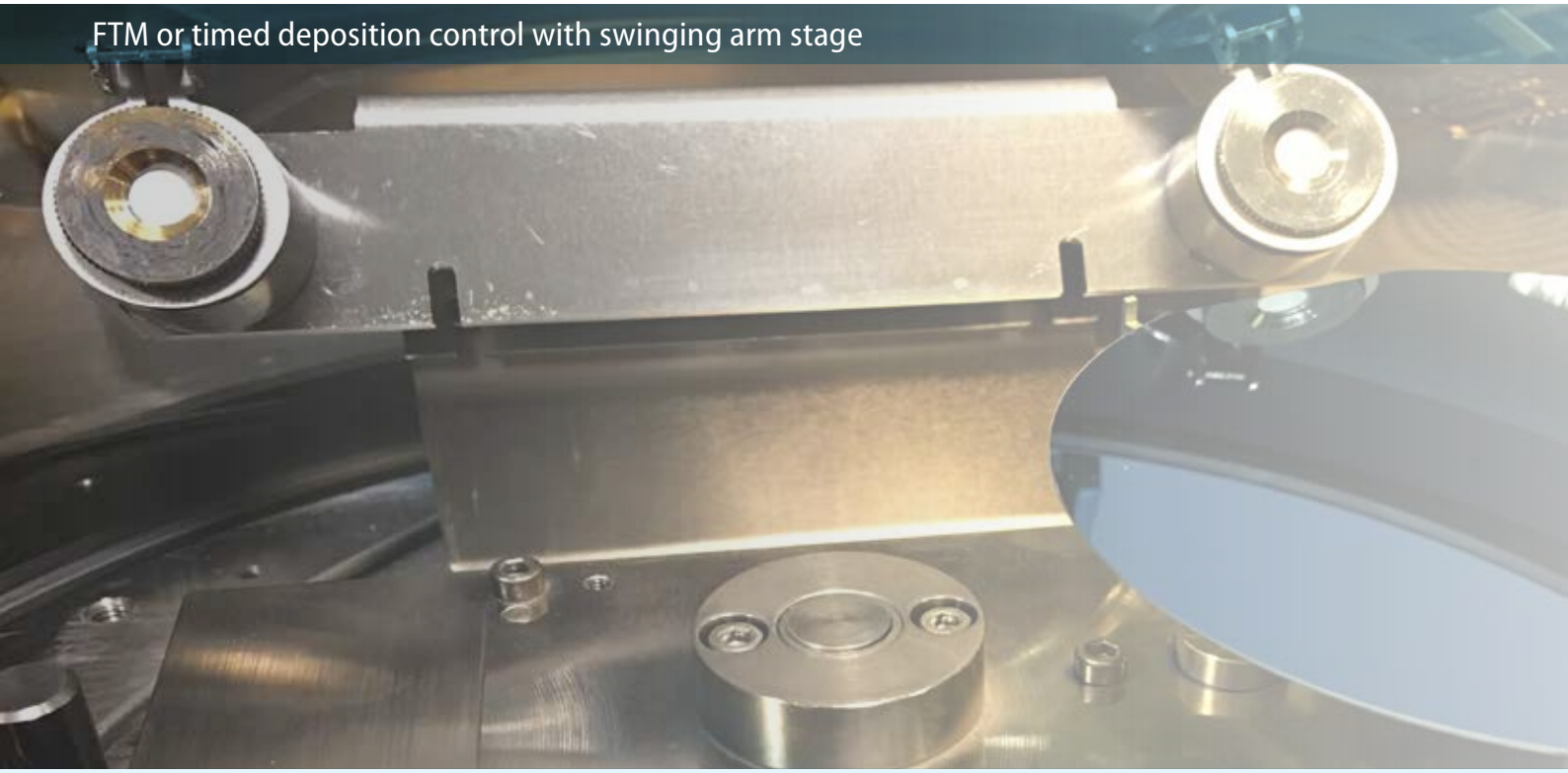
Detachable chamber with built-in implosion guard

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 improved uniformity for sputtering and to hold larger substrates.

FTM or timed deposition control with swinging arm stage



The Q Plus Series is also available in a smaller chamber format:

Q150R Plus

An automatic sputter and carbon coater suitable for use with Tungsten/ LaB_6 SEM and Benchtop SEM

Q150T Plus

An automatic turbomolecular coater - capable of both sputtering and carbon coating for a wide range of applications

Q150V Plus

An automatic high-vacuum coater for ultra-fine coatings - capable of both sputtering and carbon coating, with an ultimate vacuum of $1x10^{-6}$ mbar

The Q300T D Plus is part of Quorum Technologies internationally acclaimed Q Plus 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 Plus series is versatile, affordable and easy to use. **These products are for Research Use Only.** .

Dual head sputtering - for sequential sputtering

The Q300T D Plus has two independent sputtering heads to allow sequential sputtering of two different metals without the need to 'break' vacuum, for example, a thin 'seeding' layer of chromium (Cr) followed by deposition of gold (Au). An automatic shutter mechanism enables cleaning of oxidising sputter targets and protects the second target and substrate during coatings. For single metal applications one target can be selected.

Multiple stage options

The Q300T D has substrate stages to meet most requirements. All are easy-change, drop-in style (no screws) and are height adjustable (except the rotary planetary stage). A swinging arm stage drive is supplied as standard, which is a stage drive and positioning mechanism that positions the stage under the correct target. Rotation speed is variable between 14-38 rpm:

In addition a flat, adjustable stage capable of accepting 4" (101.6 mm) wafers is supplied as standard with the Q300T D Plus.

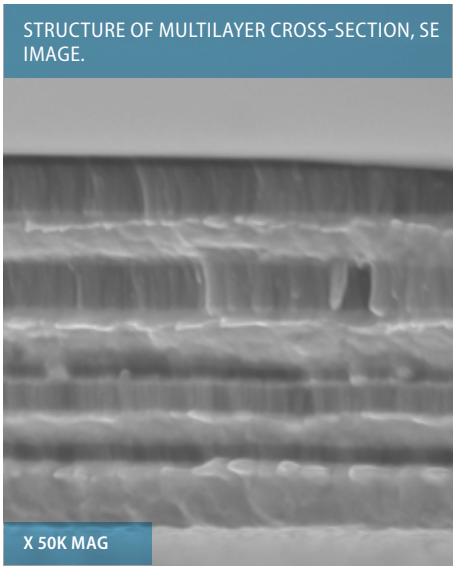
As an accessory, a 6" wafer stage is available, which is a flat adjustable stage capable of accepting 6" or 150 mm wafers. The stage includes two masks for improving uniformity of coating.

Rotation stage - 50 mm Ø. This stage only rotates and has no tilt or height adjustment.

Rotate-tilt stage - 50 mm Ø. With height adjustment (target to stage height variable between 30-80 mm). The tilt angle can be pre-set (horizontal to 30°).

Rotation stage for glass slides - 25mm x 76mm

Q300T D Plus performance:



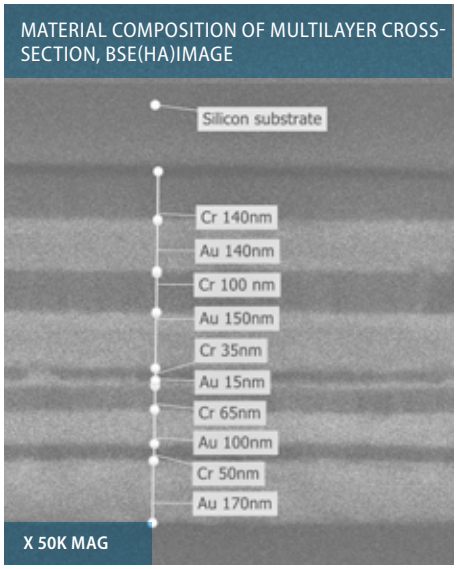


Image of fractured wafer cross-section

Q300T D Plus features

Safety

The Q300T D 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**
- **Overheating protection shuts down power supply**

Vacuum control

High vacuum turbo pumping allows sputtering of a wide range of oxidising and non-oxidising metals for thin film and electron microscopy applications. Automatic vacuum control which can be pre-programmed to suit the process and material, therefore removing the need for manual intervention or control.

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 some applications because it can heat the substrate and result in damage when the plasma interacts with the substrate. The Q Plus series uses low temperature enhanced-plasma magnetrons optimised for the turbomolecular pump pressures, combined with low current and deposition control, which ensures your substrate is protected and uniformly coated.

The Q300T D Plus uses easy-change, 57 mm diameter, disc-style targets which are designed to sputter oxidising and noble metals. It is fitted with gold (Au) and chromium (Cr) sputter targets as standard.

Pulsed cleaning for aluminium sputtering

Aluminium (Al) rapidly forms an oxide layer which can be difficult to remove. The Q300T D Plus has a special recipe for aluminium that reduces the oxide removal time and prevents excessive pre-sputtering of the target.

Film thickness monitor

The Q300T D Plus can be fitted with an optional dual film thickness monitor (FTM), which measures the coating thickness on two quartz crystal monitors located within the chamber. The thickness measured on the monitor can be correlated to the thickness on the substrate using a mathematical formula built into the software; this allows the user to control the thickness of material deposited on to the substrate. For example, the Q300T D Plus can automatically terminate a coating profile when the required thickness has been achieved. Alternatively, the process can be terminated by time.

Dual sputter head and film thickness monitor with swinging arm stage




Specifications

Instrument case

590 mm W x 535 mm D x 420 mm H (maximum height during the opening of the coating head: 772 mm)

Weight

36 kg (packed: 59 kg)

Packed dimensions

730 mm W x 630 mm D x 690 mm H

Work chamber

Borosilicate glass with integral PET implosion guard Size 300 mm outside diameter x 127 mm High

Display

115.5 mm W x 86.4 mm 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

Specimen stage

A flat adjustable stage capable of accepting either 4" or 6" wafers is mounted on a swinging arm stage, which rotates the stage under the targets to optimise coating. Rotation speed is variable from 14rpm to 38rpm

Vacuum

Rotary pump: 50L/min two stage rotary pump with oil mist filter

Turbo pump: internally mounted 70L/sec air cooled

Vacuum Measurement: Pirani gauge as standard, full range gauge available as an option

Ultimate vacuum: 5 x 10^{-5} mbar*

Sputter vacuum range: 5 x 10^{-3} to 5 x 10^{-2} mbar*

Processes

Sputter Deposition Current: 150 mA

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

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.

Services

Gases: process gas argon, 99.999% Nominal 5psi

Vent gas

Nitrogen (optional). Nominal 5psi

Quorum

+44 (0)1323 810981 sales@quorumtech.com quorumtech.com