MC 204

FULLY AUTOMATIC MICRO-CLUSTER TOOL FOR COATING & DEVELOPING

HIGHLIGHTS

- Suitable for R&D and Low Volume Manufacturing (LVM)
- High reliability, yield and uptime
- Highly configurable tool
- Customization possible for specific customer processes and throughput requirements

MC 204

GENERAL INFORMATION & TECHNICAL DATA

Key Features

Obducat's high performance MC 204 modular tool provides cutting-edge solutions for current and future R&D and low volume manufacturing (LVM) requirements. The configuration flexibility of the MC 204 makes it adaptable to processing requirements in a wide variety of applications such as LEDs, SiC components, 5G components, Si IC's, MEMS, Opto-electronic, Photonic components and Advanced Packaging.

The system can handle substrate sizes from 2" to 8" Ø or 2" x 2" to 6" x 6".

Tool Configurations

The standard MC 204 configuration is equipped with an I/O station and three modules dedicated to Coating, Developing and Thermal processing.

Coating is performed using the standard open process bowl and a standard vacuum chuck. This ensures a uniform and repeatable coating process. As an option the open bowl module can be replaced with our Rotating Covered Chuck Technology (RCCT™) module. (See tool options)

The developer can perform both puddle and spray-based processes.

The Thermal processing units can be equipped with up to 8 temperature plates in a stacker – hot plates, cool plates & HMDS vapor prime hot plate. The hot plates have a programmable temperature range up to 300°C and are equipped with programmable proximity pins. The HMDS vapor prime hot plate has a programmable temperature range up to 200°C. The process is fully automated and complies with all recognized safety standards.

- Spin speed up to 10000rpm ±1rpm open bowl depending on substrate and chuck
- Easy to operate windows-based PC with 22" color touch screen
- Unlimited process recipe / flow storage capacity plus USB port
- Batch & process parameter tracking
- Ethernet port

Tool Options

Coater Module - Rotating Covered Chuck Technology (RCCT™)

Obducat's revolutionary Rotating Covered Chuck Technology (RCCT™) process environment design provides for:

- Completely sealed solvent saturated atmosphere.
- Minimal turbulence around the substrate eliminating rotational corner effects on squared substrates, enabling industry leading resist uniformity across the entire substrate at lower spin speeds.
- Superior coating uniformity on submicron layers as well as for thick resist layers compared to open bowl.
- Reduced process cost and improved environmental profile by lowering material consumption.
- Eliminating the need for Backside Rinse (BSR).

Extended Hot Plate temperature – up to 450°C

The extended high temperature hot plates are implemented to meet the requirements needed in processes such as:

- Reflow
- Pyrolysis
- Final hard bake of protection layers

RCCT™ enable industry leading uniformity across the entire substrate

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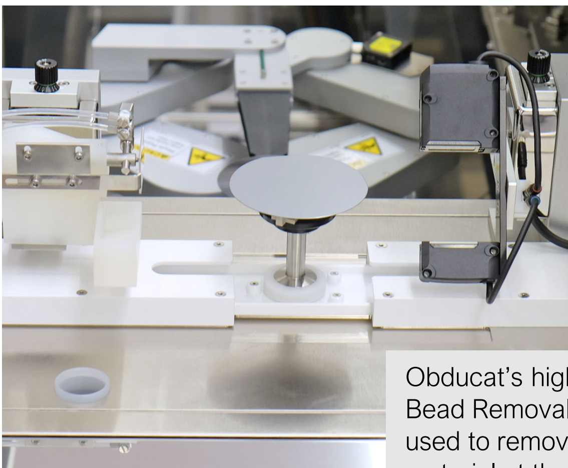
Edge Bead Removal (EBR)

Obducat's high performing EBR technology is used to remove the build-up of material at the substrate edges after spin coating. Removal of the edge bead prevents stepper focusing problems and any build-up of photoresist on the backside of the wafer. It also prevents 'chipping' of the photoresist that could cause contamination issues.

Obducat offers three types of EBR processes – standard solvent based, SmartEBR by either solvent based process or UV exposure process.

- The standard solvent based EBR process uses a programmable nozzle directing the solvent fluid towards the substrate edge thereby removing the edge bead during spinning.
- For SmartEBR solvent based process the exact shape of a substrate - wafer piece or square substrate - is first determined by a sensor. Knowing the geometry of the substrate, the system can remove the edge bead by moving the substrate while applying solvent from a programmable nozzle.
- For SmartEBR UV exposed based process, the exact substrate shape is similarly determined but in the following step the edge bead is exposed to UV light. This UV exposure allows for the edge bead to be removed in a later process step.



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Multiple Chuck solutions – Vacuum, Low contact, Bernoulli

Chuck solutions for coating:

- In case the backside has active areas, the use of an edge handling chuck with an edge exclusion of typically 4mm is recommended.
- Glass substrates are very sensitive to temperature gradients. Since vacuum substrate handling may cause such temperature gradients, Obducat offers glass substrate handling by corner suction cups with alignment pins minimizing these gradients.

Chuck solutions for Developing, Etching and Cleaning:

- Standard wafers that are wet processed use low contact chucks, where the wafer is held in place by supporting pins. and centripetal force fixing it during the high-speed drying.
- Squared substrates are held at the corners by alignment pins using low contact chucks. The advantage of this chuck is the entire backside can be rinsed.
- If the backside must be protected against aggressive (etching) medias, a Bernoulli chuck can be used. This chuck blows nitrogen which protects the entire backside against chemicals. Alignment pins hold the wafer in place and enables high spin acceleration.
- If alignment pins are not allowed, a venturi chuck can be used instead. Nitrogen is injected into the chuck, creating a vacuum in the chuck center by mean of an integrated Venturi nozzle. The nitrogen blows out close to the wafer backside edges. This also protects the wafer backside against chemicals.

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Environmental Control Unit (ECU) and Filter Fan Units (FFU)

To guarantee superior process stability and high yields, the tool can be equipped with an ECU, this will control the temperature and humidity in the processing area. FFU's can be connected to the ECU to ensure a particle free environment.

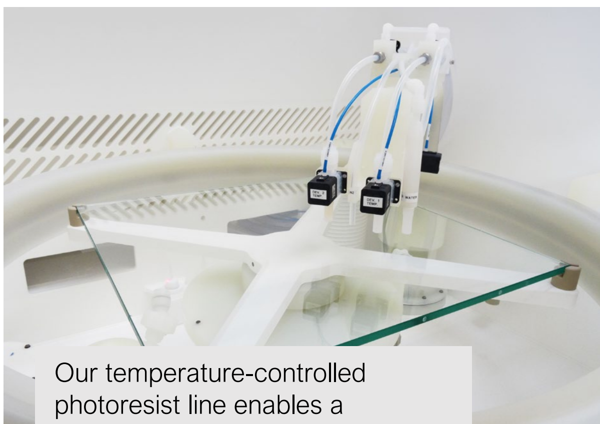
Temperature controlled resist and chemical lines

Photoresist:

A key process parameter for coating uniformity is temperature. To Enable a high level of coating uniformity, the tool can be equipped with a temperature-controlled photoresist line that will enable a repeatable temperature level of the photoresist substrate-to-substrate at point of dispense.

Developer and chemicals:

When chemicals are supplied from the wafer fab or stored outside the cleanroom the temperatures are different to the cleanroom environment causing chemicals to react and perform differently with changes in temperature. This can result in processing variations. This option can ensure a repeatable temperature level of the chemical's substrate-to-substrate at point of dispense.



Our temperature-controlled photoresist line enables a repeatable temperature level of the photoresist, the developer or chemicals substrate-to-substrate at point of dispense.

In-line film thickness measurement

This high performing measurement method uses white light interferometry, where a low pass filter blocks all wavelengths below 450 nm to protect photoresist from being exposed.

- In-situ film thickness measurement in real-time enables immediate quality control and yield monitoring.
- High speed wafer mapping with a programmable x-y stage can provide relevant data input towards root cause analysis of coating deviations.

Flood exposure - photoresist image reversal

The flood exposure module is used for photoresist image reversal often used for Lift-Off Processes.

Fully automatic module for double side coating

The tool can be equipped with an automatic wafer flip station to also enable backside processing. The module has a servo-controlled arm. It provides a full edge grip with an exclusion zone of 3mm.

Connection to wafer fab Manufacturing Execution Systems

The tool can be configured to enable connection to various Manufacturing Execution System (MES) interfaces such as:

- SECS / GEM
- OPC/UA
- Customer specific interfaces

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TECHNICAL DATA

FACILITY REQUIREMENTS

Clean-room compability	Class 10, ISO 4
Room Temperature	20-24°C
Relatively Humidity	40 - 55 %
Power	3 x 400 VAC / N / PE, 50 - 60 Hz, 16-32 A
Compressed Air (CDA)	8 bar
Vacuum	-0,8 bar
Nitrogen (optional)	4,0 bar
DI-Water (optional)	4,0 bar

SYSTEM DIMENSIONS

Dimensions W x D x H)	1200 mm x 1200 mm x 2010 mm*
Weight	Approx. 800 kg

*not including auxiliary equipment

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