



GSM

OPTICAL MONITORING FOR HIGH
PRECISION THIN FILM DEPOSITION

OPTICAL MONITORING TECHNOLOGIES

ENABLING OUR NEW WORLD!

- ACHIEVING MORE DEMANDING THIN FILM SPECIFICATIONS
- DRIVING DOWN UNIT COSTS

From the high reflectivity DBR mirrors required for maximising light output in our HBLEDs to the new gesture recognition and 3D imaging technologies for our next generation smart phones, our world relies on the cost effective deposition of optical interference coatings that demand both new levels of optical performance or repeatability from component to component and at the same time lower unit costs to satisfy manufacturing targets for mass market applications.

Within our next generation mobile networks and power devices too, thin film processes increasingly call for deposition of custom dielectrics or metal stacks at accuracies which traditional control techniques cant achieve.

Advanced Process Control Technologies (APC) like Evatec's GSM Optical Monitoring System are designed to do just that – improving precision in the deposition process for new levels of repeatability and production yield for the most demanding optical interference coatings.

OPTOELECTRONICS



- Ultrathin metal layers
- DBR reflector layers

PHOTONICS



- Multibandpass filters, mirrors, laser coatings

CONSUMER DEVICES



- Photopic filters, bandpass filters

WIRELESS



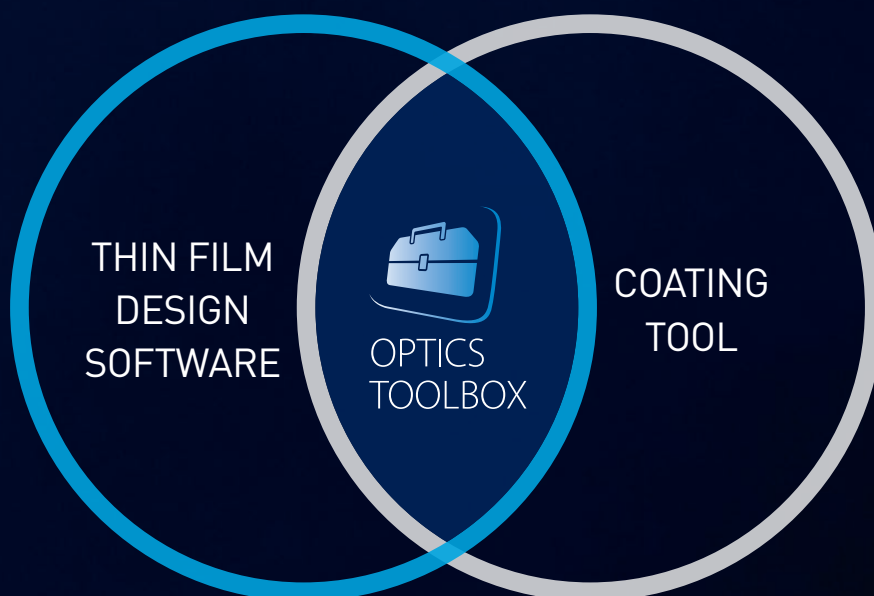
- TC SAW filter technologies for wireless communications

THE GSM1101

MAKING YOUR LIFE EASIER

- SPEEDING UP YOUR PROCESS DEVELOPMENT
- ENABLING TIGHTER MANUFACTURING TOLERANCES
- RAISING MANUFACTURING YIELDS
- LOWERING UNIT COSTS IN MASS PRODUCTION

Evatec's GSM 1101 Broadband Optical Monitoring System in combination with the Evatec's **Optics Toolbox** delivers accelerated process development and production capability for thin film monitoring in the UV, VIS or IR spectral ranges. Starting with industry standard thin film design software, **Optics Toolbox** integrates all the steps required generating a complete recipe with monitoring strategy for each layer and even uploading it to your coating tool ready for execution.



THE GSM VERSATILITY COMES AS STANDARD

The GSM1101 comes ready prepared for a wide range of coating tools and measurement modes, measuring on test glasses or direct on the substrate using a choice of monitoring algorithms.

Additional built in flexibility gives you the power to select quartz, optical monitoring or power / time as your termination method on a layer by layer basis.

NOW WITH "IN-SITU" REOPTIMISATION

For the first time, new techniques like "in-situ" reoptimisation also now offer automatic recipe tuning mid process to guarantee reproducibility and yield for even the most complex optical designs.

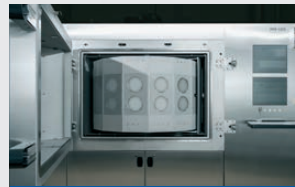
A CHOICE OF COATING TOOLS



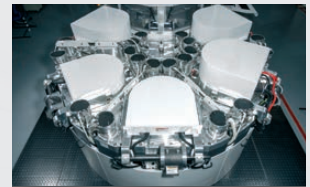
**BAK
EVAPORATORS**



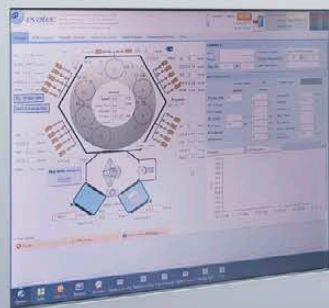
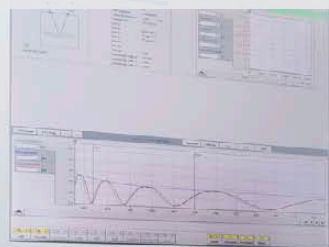
**CLUSTERLINE® RAD
SPUTTER CLUSTER**



**MSP
SPUTTER SYSTEM**



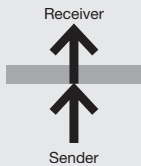
**SOLARIS
IN LINE SPUTTER**



*CLUSTERLINE® RAD
with integrated GSM
optical monitoring*

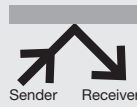


A CHOICE OF MEASUREMENT MODES



TRANSMISSION

- Available on the BAK and CLUSTERLINE® RAD



REFLECTION

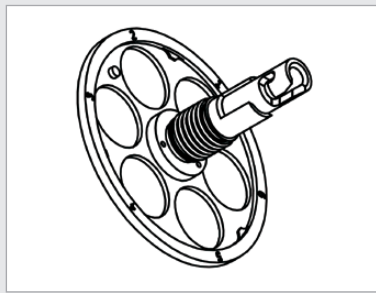
- Available on BAK, MSP, SOLARIS and CLUSTERLINE® RAD

A CHOICE OF DIRECT OR INDIRECT MONITORING



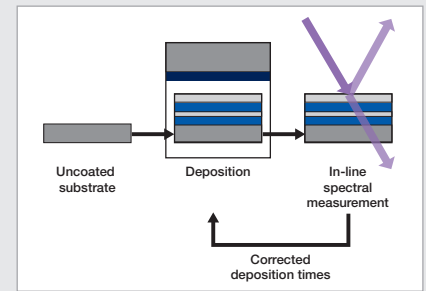
DIRECT MONITORING

- For BAK, MSP and CLUSTERLINE® RAD
- Real time during deposition



TEST GLASS MONITORING

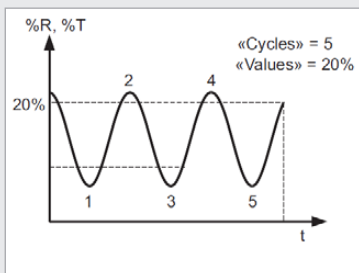
- Available for BAK
- GTC621 with 6 glasses
- GTC1100 with 140 heated glasses



CLOSED LOOP CONTROL

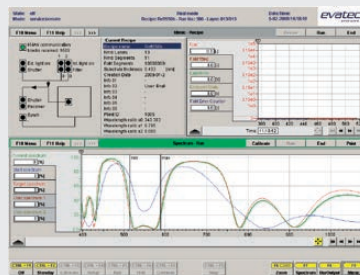
- Available for SOLARIS
- In-line analysis and correction of deposited thicknesses

A CHOICE OF MONITORING ALGORITHM



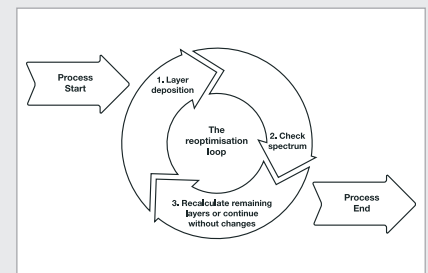
MONOCHROMATIC

- Select single wavelength according to process / layer
- Compatible with existing, production proven processes



BROADBAND

- Spectrometer measures performance over spectral range
- Built In compensation for variation in rate or refractive index

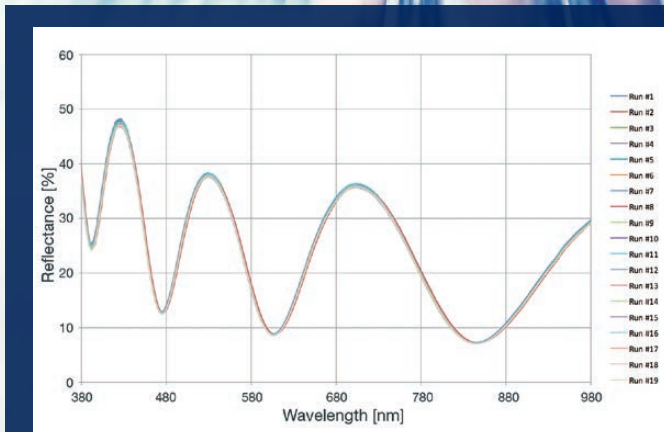


BROADBAND + REOPTIMISATION

- Real time adjustment mid process for enhanced yields
- Recover from unforeseen events e.g. power outage
- Reduce new process development times

OPTICAL MONITORING PUTTING YOU AT THE FRONT OF THE PACK

Here are just a few examples of how Evatec platforms and deposition processes using optical monitoring can cut your production cost and keep you at the front of the pack. For more information about Evatec's Optics Toolbox, Optical Monitoring and how techniques like "in-situ" reoptimisation can help you with fast track development of new processes or increase your coating yields simply visit www.evatecnet.com or contact your local Evatec sales and service representative.



SiO₂ LAYER BY SPUTTER

TYPICAL APPLICATION:

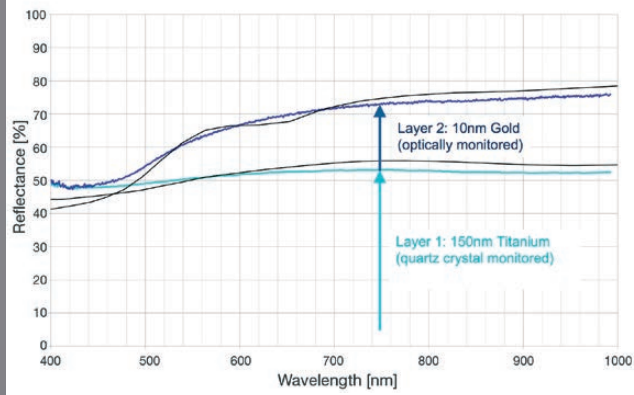
- TC-SAW for Wireless Applications

MEASUREMENT MODE:

- Direct on substrate in reflection

KEY DRIVERS

- Critical accuracy of layer thickness and run to run reproducibility
- Reduction in production costs



THIN METAL LAYERS BY EVAPORATION

TYPICAL APPLICATION:

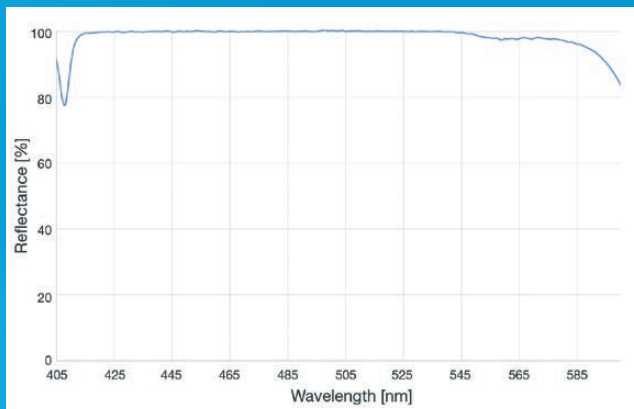
- Semiconductor & Optoelectronics

MEASUREMENT MODE:

- Reflection on test glass

KEY DRIVERS

- Significant change in reflection spectrum with small thickness variation of gold layer provides excellent production control
- Enhanced final device performance



DBR DIELECTRIC BROADBAND MIRROR BY EVAPORATION

TYPICAL APPLICATION:

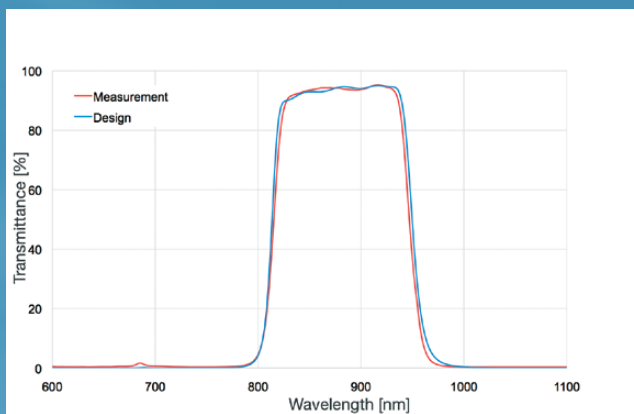
- HBLEDs

MEASUREMENT MODE:

- Reflection on test glass

KEY DRIVERS

- Run to run reproducibility
- Maximum reflection for enhanced device performance



NIR BANDPASS FILTER BY SPUTTER

TYPICAL APPLICATION:

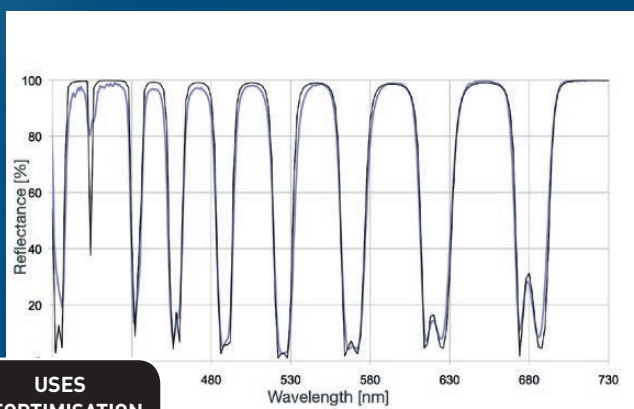
- Consumer electronics

MEASUREMENT MODE:

- Direct on substrate in reflection

KEY DRIVERS

- Repeatability across whole 8 inch wafer
- Enhanced yields and throughput for reduced unit costs in mass production



MULTI BANDPASS FILTER BY SPUTTER

TYPICAL APPLICATION:

- Consumer electronics

MEASUREMENT MODE:

- Direct on substrate in reflection with Reoptimisation

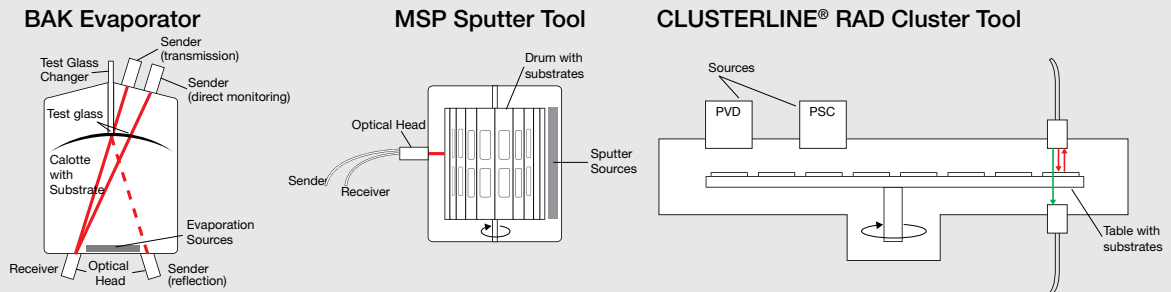
KEY DRIVERS

- Shortened process development times for complex designs
- Yield management in production

USES
REOPTIMISATION

GSM OPTICAL MONITORING FOR HIGH PERFORMANCE OPTICAL LAYERS

TYPICAL COATING TOOL LAYOUT



SYSTEM DATA

Light Sources	2 Quartz-Tungsten Halogen lamps, Plug & Play, 6000hrs life
Detectors	Temperature stabilized, CCD array, 1024 pixels
Wavelength Range	Standard: 380nm to 980nm Custom: According to customer specification
Measurement Modes	Reflection, transmission on test glass or directly on substrates
GTC 621 test glass changer	6 measurement positions, transmission or reflection
GTC 1100 test glass changer	140 heated test glasses, mixed measurement
Monitoring algorithms	Monochromatic, Broadband, Broadband with "in-situ" reoptimisation

ABOUT EVATEC

Evatec offers complete solutions for thin film deposition and etch in the Advanced Packaging, Power Devices, MEMS, Wireless Communication, Optoelectronics and Photonics markets.

Our technology portfolio includes a range of advanced sputter technologies, plasma deposition & etch as well as standard and enhanced evaporation.

Our team is ready to offer process advice, sampling services and custom engineering to meet our customers individual needs in platforms from R&D to prototyping and true mass production.

We provide sales and service through our global network of local offices. For more information visit us at www.evatecnet.com or contact our head office.



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