

In-Situ Spectroscopic Optical Monitoring/Control System and OES System

Full Spectrum, Real-time Analysis and Control of Reflectance and Transmittance During Thin-Film Deposition
Dedicated systems for Large Area Flat - Web Coating - Optical Coating



Multi Point

Single Point

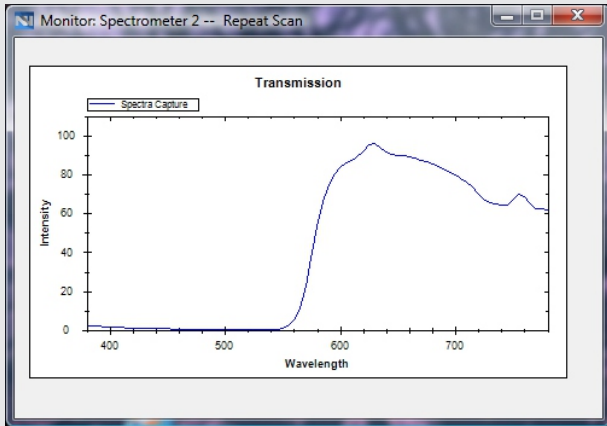
Benefits

- **Improve Yields**
- **Decrease setup time**
- **Produce more complex and difficult coating structures**
- **Save coating system time**
- **Reduce scrap**
- **Increase profit**

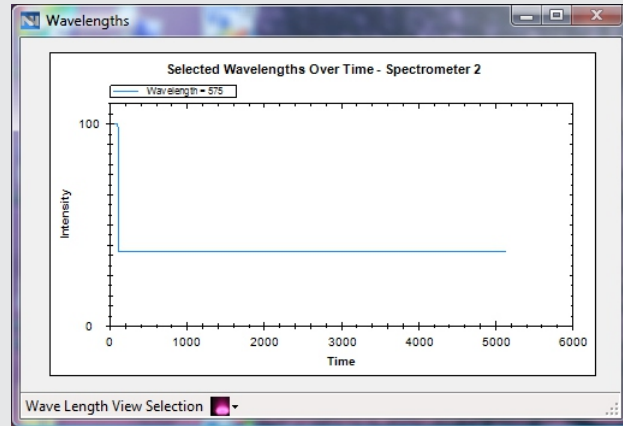
The N-Vision optical monitoring system is designed for application in the Optical Coating, Web Coating and Large Area Flat substrate markets. Deposition technology specific instruments and software tools allow monitoring and control of coatings in all thin film deposition environments. Deposition technology specific applications built upon standard building blocks of single and multipoint instruments provide market specific tools to allow deposition at peak performance.

Regardless of the market application, the N-Vision Optical Monitor will allow monitoring of coatings that will reduce cost while increasing the performance of the coating process. Customer specific statistical analysis of a run, a group of runs or even years of data is possible from data stored in the system's data base.

What will it do for me?



Transmission scan



Trend of one wavelength over time

Applications vs System Compatibility

In order to reduce deposition cost and increase control of the deposition process this instrument product series is built upon an open SQL data base containing all the run and setup data allowing the user to easily configure the system, run it and access the run data either from the operating computer or from any computer on the network in real time.

The system is capable of measuring the optical properties of deposited films during deposition providing the operator with real time spectrophotometric data of the deposited films. This allows for more accurate layer endpoints in optical coating or much more reliable and traceable coatings on large area substrates. Setup times are reduced by having in situ measurements of optical properties instantly. Because of the excellent long term stability the system is also ideally suited for application in the web coating industry.

| | Multi-Point Monitor | Single Point UV / Vis Monitor | Single Point IR Monitor |
|--|---------------------|-------------------------------|-------------------------|
|--|---------------------|-------------------------------|-------------------------|

Spectrometers

| | | | |
|---------------------|-----|-----|-----|
| UV/Vis HR-200 - 850 | yes | yes | no |
| UV/Vis HR-200 -1100 | yes | yes | no |
| UV/Vis LR-350 -800 | yes | yes | no |
| NIR LR-900-2200 | yes | no | yes |

Applications

Flexible Web Applications

| | | | |
|-------------------------|-----|-----|-----|
| Monitor Transmission | yes | yes | yes |
| Monitor Reflection | yes | yes | no |
| Monitor Plasma Emission | yes | yes | no |
| Monitor Film Thickness | no | yes | no |

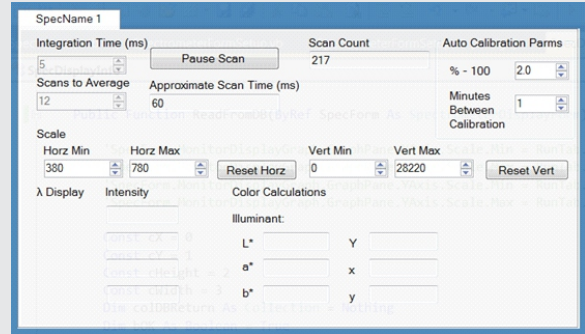
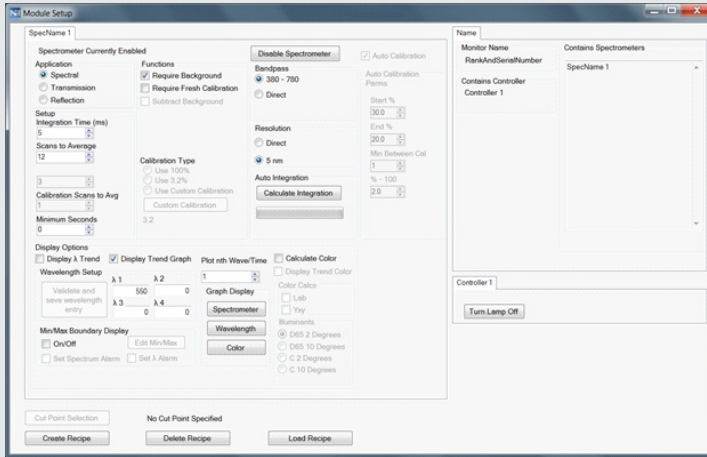
Large Area Flat Applications

| | | | |
|-------------------------|-----|-----|-----|
| Monitor Transmission | yes | yes | yes |
| Monitor Reflection | yes | yes | no |
| Monitor Plasma Emission | yes | yes | no |
| Monitor Film Thickness | no | yes | no |

Optical Coating Applications

| | | | |
|-------------------------|----|-----|-----|
| Monitor Transmission | no | yes | yes |
| Monitor Reflection | no | yes | yes |
| Monitor Plasma Emission | no | yes | no |
| Monitor Film Thickness | no | yes | no |
| Cut point control | no | yes | yes |

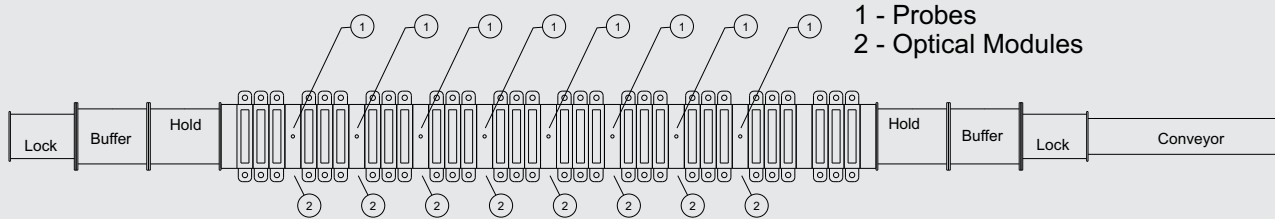
In-Situ Spectroscopic Optical Monitoring System



Master control window controls each spectrometer and displays its tabular data

All the components in the system from spectrometers to digital I/O can be configured from one screen. User defined I/O and spectrometer details are configured from the related tabs.

Typical Coating System
Single Channel / Zone Monitor System



1 - Probes
2 - Optical Modules

Features:

Broadband spectrographic measurement allows the system to display wavelength versus transmission or reflection through the entire visible spectrum many times a second. Trending of calculated color and specific wavelengths allow the operator to control his process with ease. Set points can be configured to notify the operator when the controlled process is moving out of control so corrections can be made prior to loss of product. These same spectrographic measurements reduce the setup time of complex coatings by allowing laboratory quality measurements to be made in the coater during the setup process.

Dual and single beam modes are available for long production runs of many hours.

Automatic calibration and background functions are available for use between measurements of product.

Large easy to view displays provide at a glance understanding of where your process is going. Displays as large as 48" LCD's are available.

Full integration to your coating system is provided with all necessary hardware, fixtures and digital interfaces. Process support is available from our experienced engineers and scientists to ensure maximum system effectiveness.

Specifications

| | UV/Vis HR-200 -1100 | UV/Vis LR-350 -800 | NIR LR-900-2200 |
|-------------------------------|---|---|---|
| Spectrometer Type: | Asymmetrical crossed Czerny-Turner | Asymmetrical crossed Czerny-Turner | Asymmetrical crossed Czerny-Turner |
| Focal Length: | 42 mm input; 68 mm output | 42 mm input; 68 mm output | |
| Entrance Aperture: | 25 µm wide slit | 25 µm wide slit | 25 µm wide slit |
| Grating: | 600 L / mm, Blazed at 300 nm | 600 L / mm, Blazed at 300 nm | 100 L / mm |
| Wavelength Range: | 200-850 nm | 200-1100 nm | 400-800 nm |
| Pixel Resolution: | 0.164 nm / pixel | 0.246 nm / pixel | 0.439 nm / pixel |
| Optical Resolution: | <1.5 nm FWHM | <1.5 nm FWHM | <1.5 nm FWHM |
| Stray light: | <0.05% at 600 nm; 0.10% at 435 nm | <0.05% at 600 nm; 0.10% at 435 nm | n/a |
| Signal to noise ratio: | 300:1 (at full signal) | 300:1 (at full signal) | 1500:1 (at full signal) |
| Integration time: | 3 ms - 10 seconds | 3 ms - 10 seconds | 10µs - 10 seconds |
| A/D resolution: | 16 bit | 16 bit | 14 bit |
| Dynamic range: | 1300:1 for a single acquisition | 1300:1 for a single acquisition | 4600:1 for a single acquisition |
| Detector: | 3648 element CCD array | 3648 element CCD array | 1024 pixel linear CMOS |
| Pixel size: | 8 µm x 200 µm | 8 µm x 200 µm | 7.8 x 125 µm |
| Typical Stability: | < .1% F.S. / Hour Single Beam | < .1% F.S. / Hour Single Beam | < .1% F.S. / Hour Single Beam |
| Computer to OM: | 100 meters per leg | 100 meters per leg | 100 meters per leg |
| Power Requirements: | 100 – 240 VAC, 50-60 Hz | 100 – 240 VAC, 50-60 Hz | 100 – 240 VAC, 50-60 Hz |
| Light source: | Thermally stabilized low voltage QH lamp. | Thermally stabilized low voltage QH lamp. | Thermally stabilized low voltage QH lamp. |