

The Mahlo InfraScope Si Online Spectrometer Silicone Measurement

Finally, an Online Silicone Measurement Sensor capable of measuring down to 0.25 microns (0.25 gram per square meter) while maintaining longterm accuracy and reliability in a harsh factory environment.

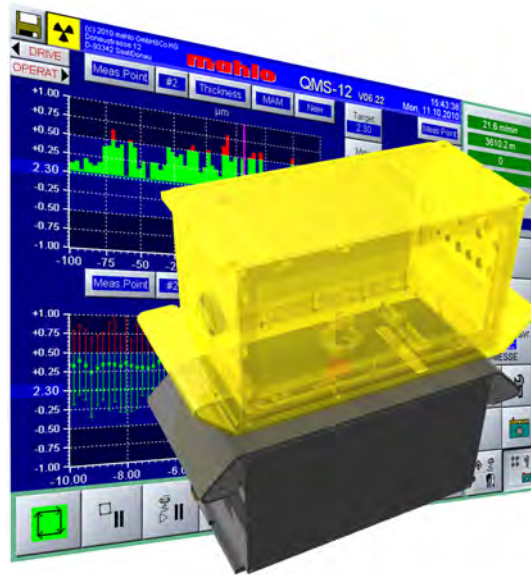


Fig. 1: Infrascopie NIR

Mahlo InfraScope Si Features:

- Designed from the ground up as an ONLINE Scanning instrument
- Industrially Rugged and Reliable
- Extremely Selective Silicone Measurement
- Very High Resolution and Low Noise
- 1ms Sampling rate
- Measures down to 0.25 grams per square meter
- Easy to Calibrate
- Non-Nuclear
- Single-Sided Measurement

InfraScope Si

History:

The online measurement of the silicone basis weight on release paper has been a great challenge as the coating basis weight is typically only in the range from 0.5 to 5 g/m². Until now no reliable online sensor has been available.

- Difference measurements with nuclear sensors before and after the coating can be very costly and do not provide very satisfactory results as the silicone coating basis weight is very light compared to that of the base paper.
- Optical thickness (interference) measurements are adversely affected by opacity, web flutter and web angle (ripples, edge curl), and have not been proven to be reliable for online scanning applications.

- Laboratory spectrometers were adapted onto scanning platforms, but were eventually abandoned as they were never fundamentally designed for the vibration, temperature extremes and continuous use requirements of a factory environment. Field calibration techniques were never satisfactorily developed requiring PhD level support.
- There have also been attempts to measure the silicone coating with optical filter wheel systems working in the Near Infrared (NIR) and Mid Infrared (MIR) spectral ranges. In the NIR the silicone absorption is quite low, and with the broad spectral resolution of the filter wheel systems it is not possible to separate the silicone absorption from the overlapping absorption of the base paper. In the MIR the absorption of the silicone is much higher, but the detectors are very sensitive to changes in ambient temperature.
- The NIR diode array spectrometer used in the Mahlo InfraScope Si is designed specifically for online applications, and its very high spectral resolution enables the fast and precise measurements necessary for thin coatings on fast moving webs. With standard thermoelectric cooling of the detector array, excellent long term stability of the measurement is achieved. Existing installations in harsh paper mills and solvent-based adhesive coating lines have proven the Mahlo InfraScope Si to be very rugged, completely reliable and virtually drift-free.

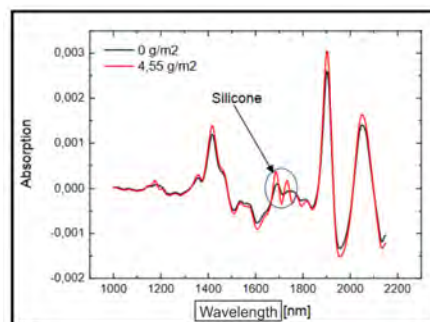
InfraScope Si

How it Works:

The sample is illuminated with a stable source of broad spectrum infrared light (1–3 μ). The High Resolution Spectrometer scans the infrared spectrum with a resolution of 1 nanometer (nm)!

Analyses of the Spectra are automatically performed by well documented software routines to provide very high resolution absorption peaks for the measurement of interest. Sample calibration is easy as the silicone absorption spectrum is well known and distinct from substrates and adhesives. Substrate color or composition has very little effect on the InfraScope Si measurement of silicone.

Coupled with Mahlo's large selection of precise measurement sensors and the industry's most rugged and reliable scanner offering, Mahlo's InfraScope Si is just one component of a complete measurement and quality control system.



Raw NIR Spectra of Paper with and without Silicone

