

# In-Line Coat Weight Measurement of Silicone on Paper Substrates

APPLICATION BRIEF

Applying silicone to a paper web substrate is often used in producing release liners, which are used in adhesive products like labels and tapes. Over the last several decades, companies have experimented with numerous methods for analyzing the silicone release layer on a coating line. One method is the “Total Mass Subtraction” process, which combines analysis from beta transmission sensors, spectrometers, and X-ray fluorescence sensors to measure the complete web mass pre- and post-silicone application. These multiple basis-weight devices working in unison provide a coat weight measurement profile.

However, the Total Mass Subtraction method is prone to complexities—aligning scanning data from multiple instruments is not always intuitive—and inaccuracies—inherently thin coat weights of the application process mean there is a minimal margin for error.

Recently, online near-infrared (NIR) analyzers, such as the **Guardian-HD Series Web Profiling Online NIR Analyzer**, have emerged as a practical, versatile, and minimally invasive method for analyzing coat weight of the silicone application process on paper substrates.



*Guardian-HD Web Profiling System to measure coat weight.*

## ABOUT THE PROCESS

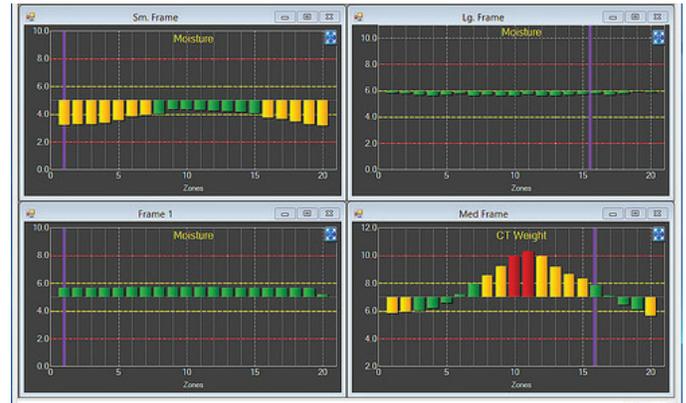
The process begins by preparing the paper web. Paper is unwound from a roll and fed into the coating line. Surface treatments, such as a corona treatment, may be applied to improve silicone adhesion on paper. The silicone coating is applied using various methods:

- Gravure coating: Silicone is transferred from the gravure cylinder to the paper web
- Mayer rod coating: Silicone is applied using a wire-round rod
- Slot die coating: Silicone is extruded through a slot die onto the paper web

The coated paper then passes into an oven to cure the silicone. Ultraviolet (UV) or thermal curing methods may be used depending on the type of silicone. After curing, the paper is cooled and rewound into rolls for further processing or shipment.

## WHERE IN-LINE NIR CAN MANAGE QUALITY

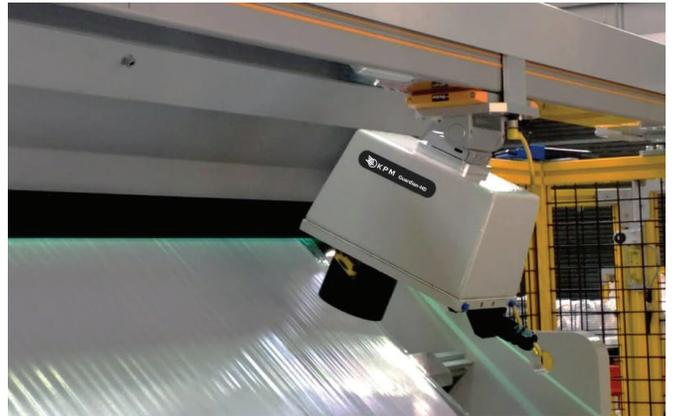
**Full-Width Coat Weight Measurement:** No matter the silicone coating process, variations in applied coating across the paper web are possible. Uniform coat weight ensures release force, which is crucial for the performance of adhesive products. The Guardian-HD Web Profiling NIR Analyzer Series sits upon a traversing frame that continually scans the complete width of the web, reporting real-time coat weight measurements in an easy-to-follow display. The system also allows for move-and-park analysis, allowing the operator to analyze localized areas of the coating applicator process and take corrective actions faster should a specific applicator run out of alignment.



The Guardian-HD Web Profiling System's easy-to-follow display identifies regions with too much or too little silicone coating across a full paper web width.

## INSTALLATION RECOMMENDATIONS

Install Guardian-HD Online NIR Analyzers between 15-40 centimeters (6-16 inches) from the product for best performance. Sensors can be positioned horizontally, vertically, or for under-side viewing of the material, depending on the application's needs.



Each Guardian-HD frame is built for its specific application. The NIR sensor can be positioned in different ways to accommodate reflective surfaces, as well as horizontal, vertical, and underside viewing.

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