

IN-PROCESS MEASUREMENT

Nordson
MEASUREMENT & CONTROL

FOR NEXT-LEVEL
GAUGING PERFORMANCE
IN CONVERTING
APPLICATIONS



Moisture
Coat Weight
Film/Layer Thickness

Maximizing Process Performance and KPIs

Series 9 for Critical Converting Measurements

For more than 50 years, Nordson Measurement & Control has designed and built measurement solutions specifically developed to meet the manufacturing challenges faced by the converting industry.

Our latest solution, the Series 9 near-infrared (NIR) gauge, is the sum of what we've learned over these years to bring you the best-in-class, best-in-value on-line measurement system on the market today.

The Series 9 gauge keeps you ahead with:

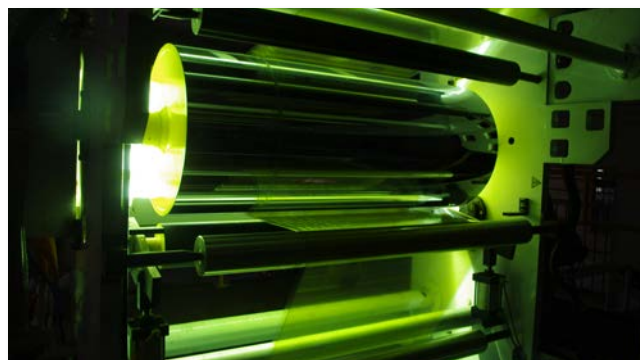
- Greater Process Vision – perform ultra-accurate measurements of moisture, coat weight, degree of cure and film/layer thickness across a wide range of converting applications to tightly control processes
- Long-Term Stability – get ultra-reliable operation without the need for recalibration, systematic monitoring or correction for drift
- Advanced Diagnostics – includes a powerful feature set for preventative maintenance and maximum uptime
- Lowest Cost of Ownership – easy operation and maintenance enables manufacturers to realize immediate and long-term value over the lifetime of operation



Unparalleled Performance Across All Applications

Coating Measurement Capabilities

- Water or solvent-based
- Solventless
- Wax dip
- Impregnation
- Polymer extrusions
- Barrier coatings
- Resin coatings
- Hot melt



Extrusion, Coating and Lamination for Industrial Material Applications
Single coating station
Tandem coating station (up to 3 stations)
Extrusion Coating and Lamination for Packaging Materials Applications
Single coating station - Flexible packaging
Tandem coating stations (up to 4 stations) - Liquid packaging (aseptic) - Flexible packaging
Textile Coating
Polyurethane
Latex
Silicon, stain resistant coatings
PVC
Coil and Metal Foil Coating
Wax, oil, chromate, polymer, lacquer on steel
Adhesive, wax, oil, lacquer on copper
Adhesive, polymer, wax, oil, lacquer on aluminum

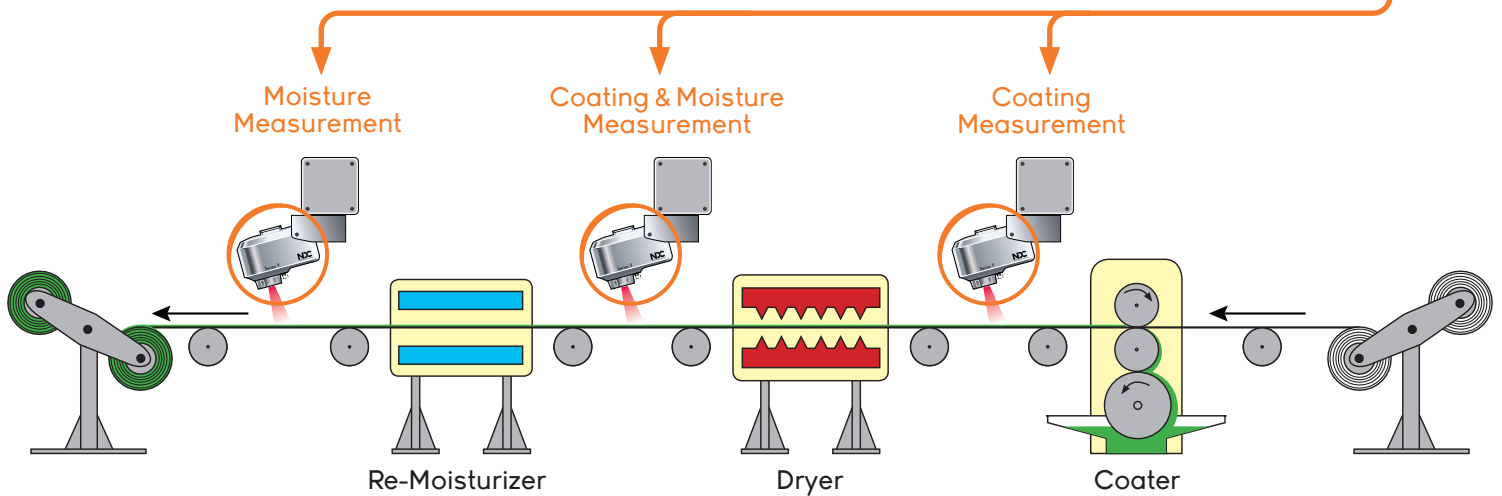
Speciality Coating
Electrode battery coating
Dry photoresist coating
Optical films including PDP and LCD
Window and glazing films
Paper Coating
Carbonless coating
Thermal coating
Adhesive coating (label stock)
PVDC coating
Silicon coating (release papers)
Polymer Film Coating
Adhesive labels, tapes and transdermal patches
Laminating pouches and protective films
PVDC
Abrasives Manufacturers
Makers
Sizers
Up to 5 scanners and 6 sensors

Delivers Industry-Leading Accuracy with Unrivaled Long-Term Stability

The Series 9 gauge can be setup in a wide range of configurations based on your process application. As standard, it measures over a 25 mm diameter beam patch, with 10 mm or 60 mm available optionally. The Series 9 is suspended over the process line at a distance of 200 mm from the mean product height, and tolerates product height fluctuations of ± 50 mm.

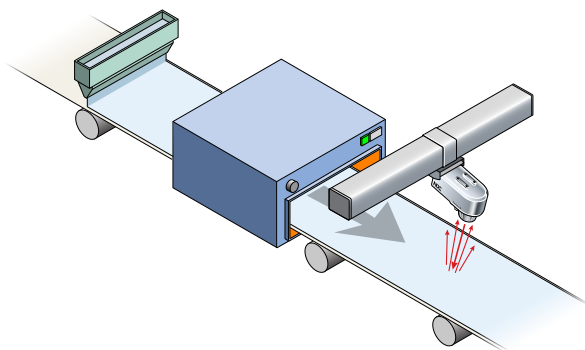


Paper Coating Line

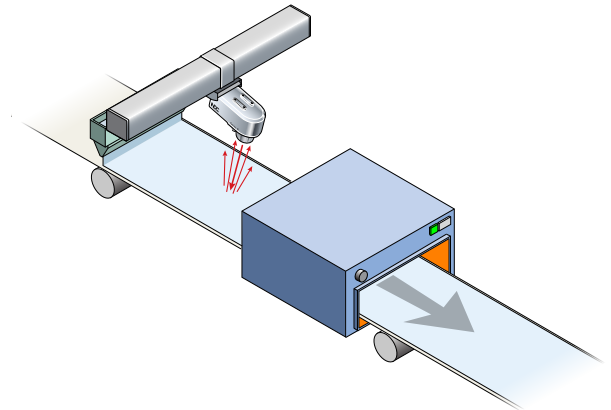


Example Configurations

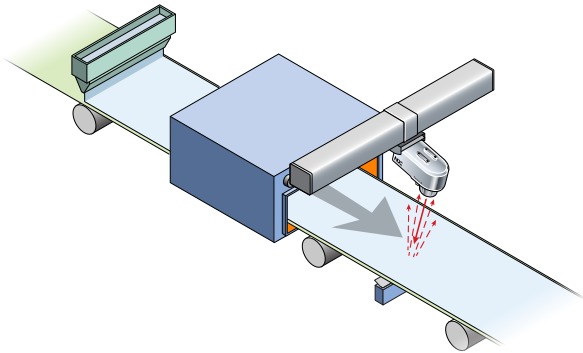
Coatings on Paper (Dry End)



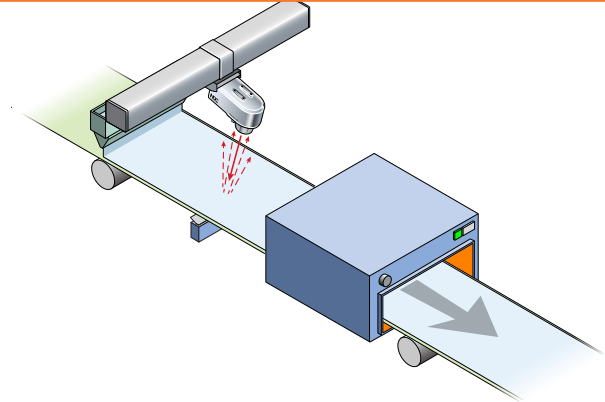
Coatings on Paper (Wet End)



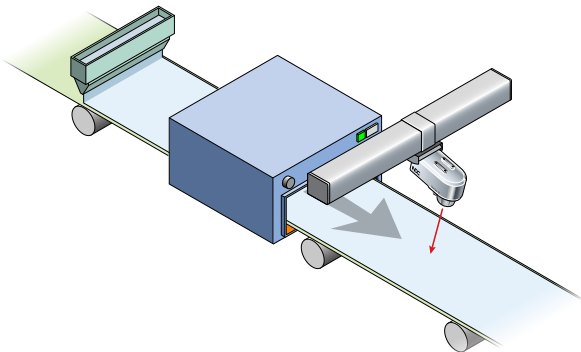
Coatings on Polymer Film (Dry End)



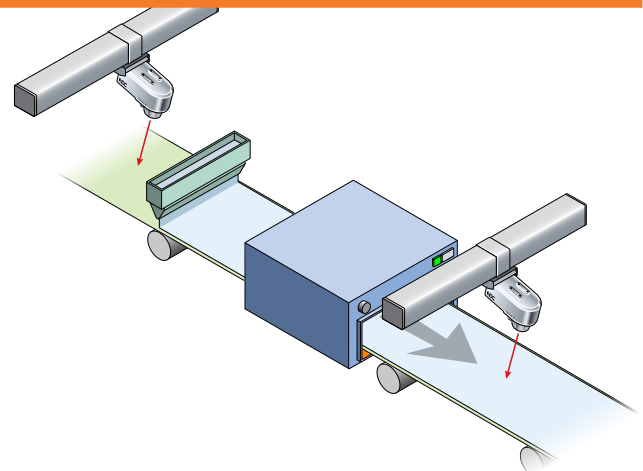
Coatings on Polymer Film (Wet End)



Single-Point Gauge Setup



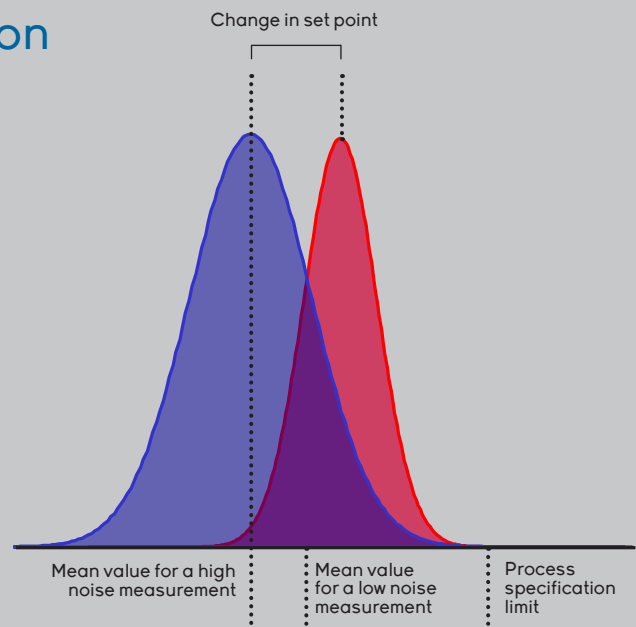
Differential Multi-Point Setup



The Benefit of Improved Precision

The Series 9 gauge has been optimized to provide the fastest, highest resolution and most precise measurements available.

The statistical plot shows how the Series 9 gauge delivers a low standard deviation, allowing tight control over the lower and upper limits for increased yields, reduced energy consumption and faster ROI.



Benefit from Specialized Measurement Techniques for the Converting Process

Proprietary web gauging technology solves the unique measurement challenges faced by the converting industry.

■ FastStart

Fast Start provides an early indication of coat weight during startup and product changes and is valuable for multi-scanner measurement configurations. Once the process lag time between scanners has passed, the system automatically transfers scanner timing to provide Same Spot functionality.

■ Specialty Coat Weight Measurement

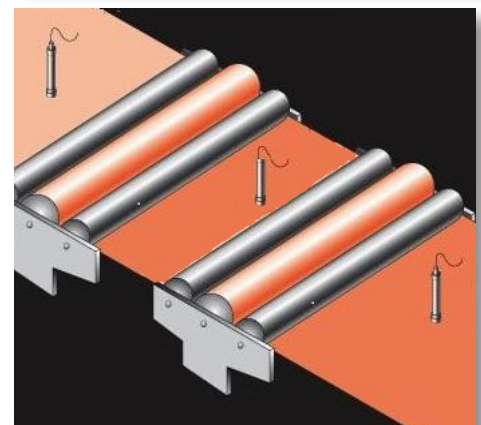
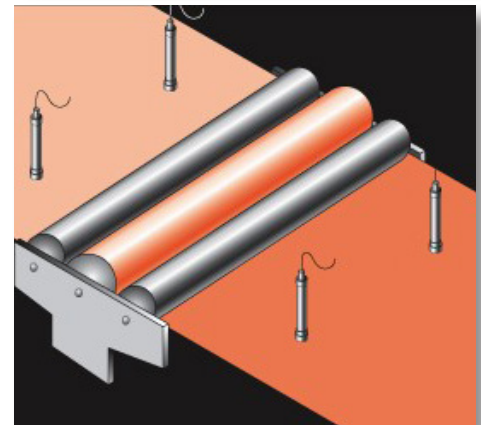
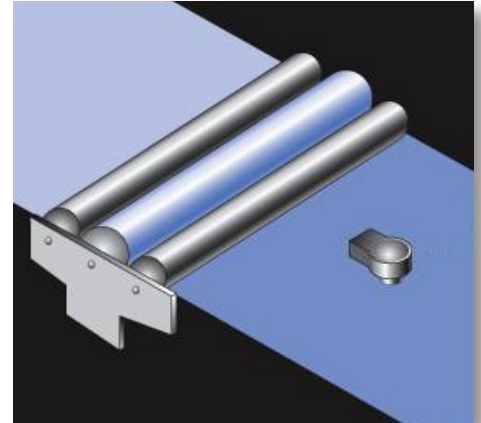
Advanced Pattern Recognition software measures the coat weight of “patch coatings” and excludes measuring the uncoated machine direction and cross direction areas between each coating deposition. This powerful software also measures the coat weight of “stripe coatings” and ignores the machine direction gaps between the applications.

■ Solvent-Based Coating Measurement

For processes with consistent solids ratio in the wet coating, a final coat weight profile determination may be made based on measurement of the wet coating, prior to drying.

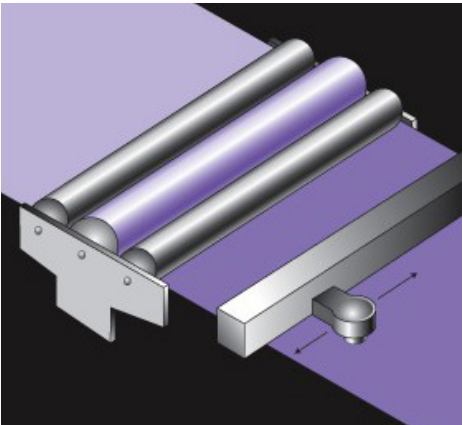
■ Direct Selective Measurement

A single infrared sensor can be used where coat weight measurement is required. The NDC infrared sensor measures just the coating layer directly and independently from the substrate layer with its selective measurement technology.



Explosion-Proof and Harsh-Environment Equipment Options

Certain scanners and sensors are available in ATEX Zone 1 approved designs. Contact a Nordson representative for more information

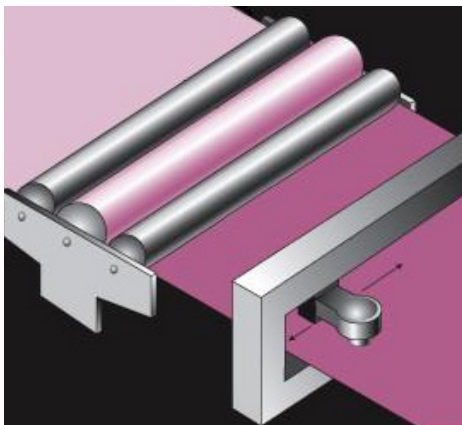


■ **Combination Measurement**

Two sensors are placed on a single scanner after the coater. The selective sensor measures the coating directly while the basis weight sensor measures total mass. The basis weight of the substrate is determined by subtraction.

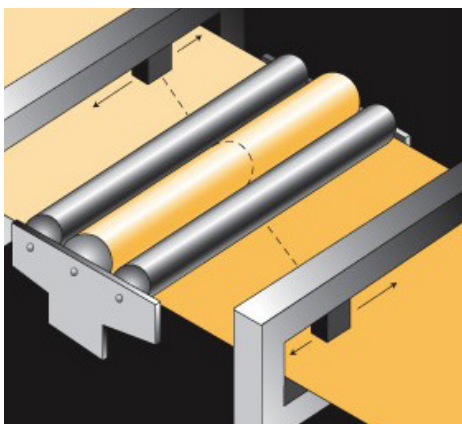
■ **Differential or Subtractive Coat Weight Measurement**

Two sensors are used where the first sensor measures the substrate and the second sensor measures the total weight (coat + substrate). The coat weight is calculated by subtracting these two measurements.



■ **"Same Spot" Measurement**

Some substrates such as paper exhibit significant formation or weight variations. Same Spot Measurement assures that the sensors of multi-scanner systems are synchronized so that each sensor traverses precisely along the same path on the web. This eliminates any substrate variability from affecting the coat weight measurement. This feature can also ensure same-spot measurement throughout line speed transitions.



■ **"True Net Coat" Measurement**

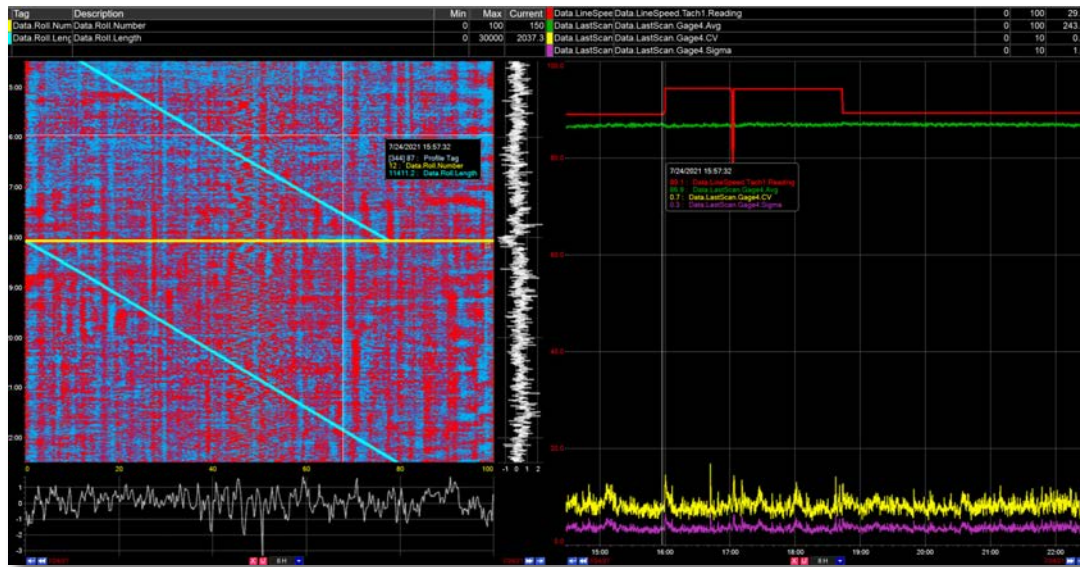
In addition to Same Spot, the NDC differential measurement system can also employ "True Net Coat." The True Net Coat model allows for both sensors (total and base) to be calibrated against the coat response curve which enables a far more accurate net coat calculation.

Process Visibility: The Key to Optimizing Your Production Operation

DataFusion

The NDC DataFusion collects real-time quality data from continuous web processes via scanning on-line measurements such as thickness, coat weight and moisture. These measurements are stored in an SQL database. DataFusion transforms this data into a visual representation so you can quickly view the quality of products manufactured on a roll basis in both real time and historically.

A 2D heat map is used to visualize the total quality of the roll from “edge to edge” and from the start to the end of the roll. Key product quality parameters are displayed on a trend plot for easy analysis of process variables and calculations. Examples include minimum/maximum values and standard deviation. The heat map also enables customers to optimize their downstream operations such as slitting. The trend display allows customers to see product quality trends and take corrective actions as required to maintain quality.



2D Profile/Trend Heatmap, Profile Scan and Trend Plot Display

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