

# Monitor Color and Brightness Directly on the Paper Machine



Paper mills must operate efficiently to remain competitive. At machine startup, color and brightness are typically the last parameters to be brought into specification. An efficient inline color measurement and closed loop color control system enables operators to achieve the right color by just pressing a button. While the operator must still set machine parameters, an inline system saves time by adjusting color and OBAs (if used) in parallel. This not only saves time at startup, but also for every shade and grammage change.

## What is an Inline Color Measurement and Control System?

An inline system includes a non-contact spectrophotometer and a frame to position the device at the right distance over the paper production line. The spectrophotometer connects with quality control software to monitor the actual color and store the data throughout the run as well as adjust colorants at the dyeing station at the beginning of the process. Even the smallest color deviations are immediately displayed on screen to maintain narrow tolerances. Color corrections are carried out automatically – even when the actual color is far away from the target – using a mathematical algorithm to calculate all necessary dye adjustments in one step. This takes the guesswork out of the process.

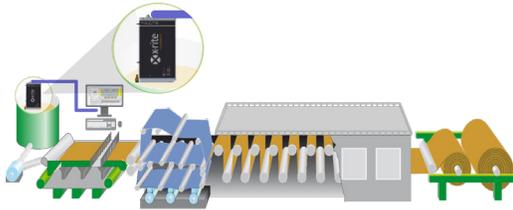
Inline devices are built to operate in harsh environments so ambient light, vibrations, web speed and web flutter do not influence measurement results. The custom frame is designed to swivel off in case of a paper break to facilitate the threading of the new web. As soon as the paper is stable again, the measuring device automatically swings into measuring position and starts measuring. An inline system can also be set up with two instruments to simultaneously monitor and control both sides of a paper.

Capturing exact measurements directly on the paper machine enables immediate corrections by the closed loop system or the machine operator.

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## When to Measure Paper Color

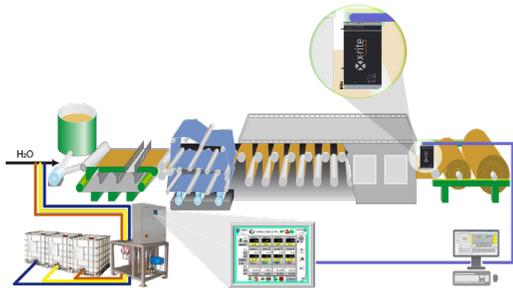
An inline color measurement system helps machine operators keep color and brightness in harmony. The most common place to measure color is at the end of the machine shortly before reel up because it offers excellent correlation with the results from the laboratory. However, an inline system can also measure the liquid pulp stage for an early warning system, and laminated paper after the press section for better correlation to the paper laminated on the wood.



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### Inline Color Measurement in the Liquid Paper Stock

Measuring color inline in the liquid stage provides an early warning system even before the pulp is on the machine. Although the measured color will not correspond to that of the finished paper, detecting a color change in the pulp enables operators to make adjustment before the pulp is on the machine or even before production begins. Using an inline system to monitor color at the liquid stage can compare batches, define the mixing of two material flows such as waste paper with “clean” material, determine the influence of adding scrap, and detect optical brighteners.

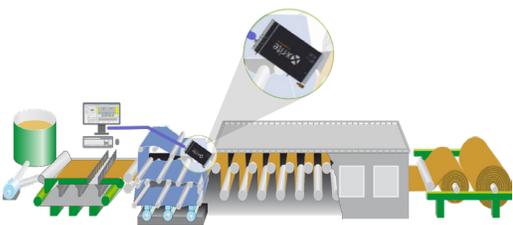


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### Inline Color Measurement Before Reel Up

Measuring color before rewinding is ideal for testliner, colored tissue, fine colored or white paper, cardboard, décor paper, security paper, and thin printing paper. Measuring the finished paper before winding offers very good correlation to the laboratory values, where the paper is measured in the stack. Since the inline measurement is done only on a single layer, it is necessary to also measure opacity for non-opaque papers and recalculate to an infinite layer to correlate with the lab.

Measuring color before rewind is also ideal for closed loop color control because color fluctuations in raw materials will end up as shade changes at the end of the machine. An inline color measurement system reliably detects even the smallest deviations, calculates the necessary countermeasures for all dyes in one step, and sends the calculated actions to the dyeing station. Thus, the color at the end of the machine will have only minor variations even when the raw materials change.



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### Inline Color Measurement Between Press and Dryer

Measuring color inline between the press and dryer is ideal for pressed and laminated décor paper. The color of the pressed paper must match exactly, but the refractive index of the resin or varnish will change the color impression of the paper. For laminated paper, an inline system can measure the wet paper before drying with a good correlation to the finished product because the water in the paper has a similar refractive index to that of the pressed paper. If necessary, a redyed strip can be produced and measured without having to make another lamination, further shortening transition times.

## A Fast Return on Investment

An inline color measurement and control system is a great tool to help operators control paper machines for efficient runs by identifying color shifts early and automatically adjusting dye pumps to bring color back into tolerance. An inline system offers automatic start up and shade changes to minimize operator intervention, speed start-up, shorten transition times by up to 50%, reduce dye usage, and produce less waste. Entire production runs will have very little variation, which corresponds with high market acceptance of the finished product for a fast return on investment.