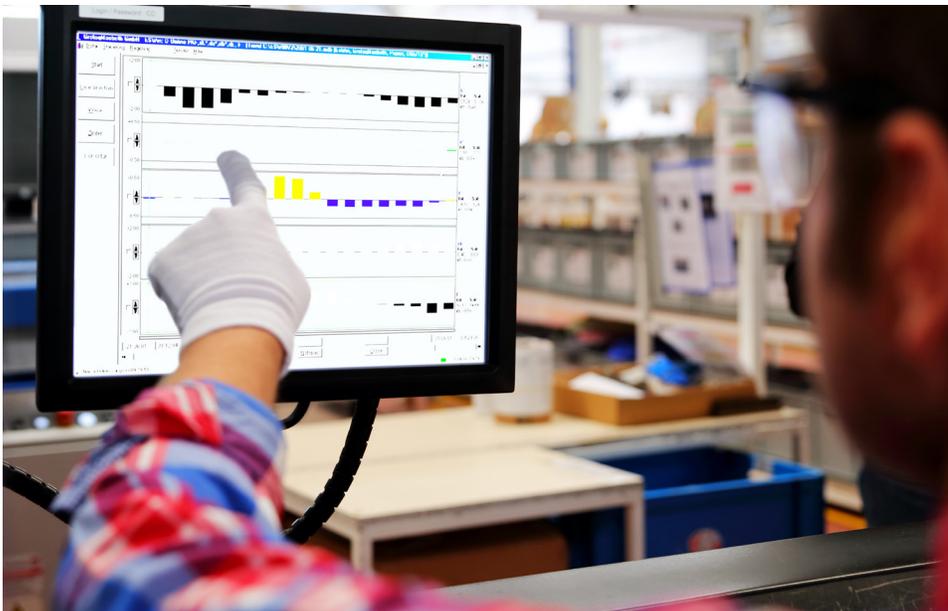


X-Rite Inline Color Measurement Solutions

For Paper Mills



Quality Color with Less Waste for Better Market Acceptance

Papermaking has always been a complex process.

The pulp is produced from wood or recycled paper as well as a variety of chemicals, dyes, and papermaking agents to achieve stability and remove impurities. Each of these raw and recycled materials impacts the color of the pulp and final paper, which must fall within tight color tolerance or the customer will not claim the shipment. On a fast-moving paper line, even a slight color shift can ruin an entire run in no time.

In addition, today's consumers are also looking for a paper company that is focused on sustainability and recyclability. This important trend is encouraging mills to reduce clear cutting, water use, greenhouse gas emissions, fossil fuel consumption and clean up their impacts on local water supplies and air pollution.

X-Rite makes it possible for paper mills to achieve accurate color and meet sustainability initiatives to win the bid and secure future business. An integrated inline color measurement and control solution installed on the production line can measure and compare color in the laboratory and on the paper machine at multiple critical points to help pulp and paper-making companies stay competitive, reduce carbon footprint, and capitalize on industry growth.

Keep Color and Brightness in Harmony, From Pulp through Final Roll Up

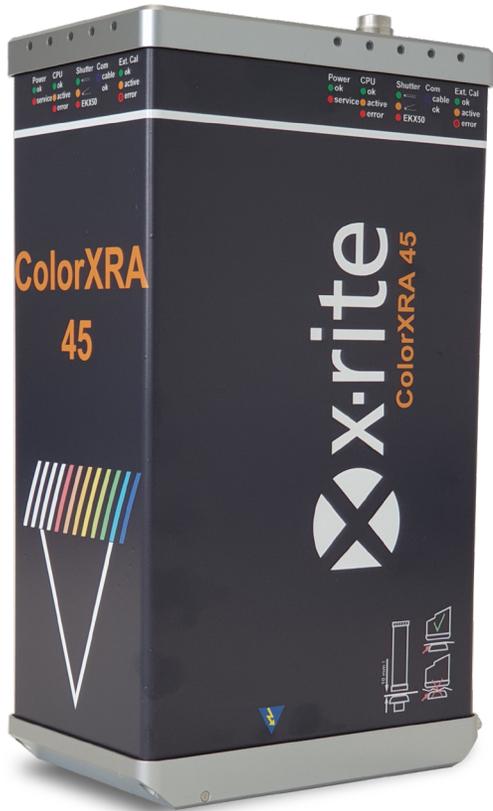
X-Rite's color measurement and control system spans the entire papermaking process. On the moving production line, it measures and evaluates color and brightness in the pulp liquid, between the press and dryer sections, and finally before reel-up for automatic closed loop quality control. In the lab, it evaluates final color before shipment and tracks quality according to industry standards.

Achieve a Fast ROI

With an X-Rite color measurement and control solution, paper mills can:

- Take consistent spectral color measurements on the production line and in the lab
- Maintain 100% color control throughout production
- Reduce start-up time by up to 30%
- Shorten transition times by up to 50%
- Ensure reliable color measurement with <0.3 dE color correlation to the lab
- Save on dyes or optical brightener agents by up to 50%
- Avoid off spec production
- Minimize maintenance costs

Accurate Paper Color, Batch-to-Batch and Year to Year



X-Rite's long history and expertise in color measurement helps pulp and paper manufacturers get color right, the first time and every time, which translates into better overall quality, increased production output and reduced costs.

Make Decisions Based on Fact, Not Guesswork

- See real-time color data of the running production line
- Get early notification of color shifts
- Automatically adjust dye pumps to bring color back into tolerance
- Take corrective action before a run is wasted
- Automatic start-up and shade changes for up to 50% quicker transition times
- Create a report for each reel

Run Stable Production in a Busy Environment

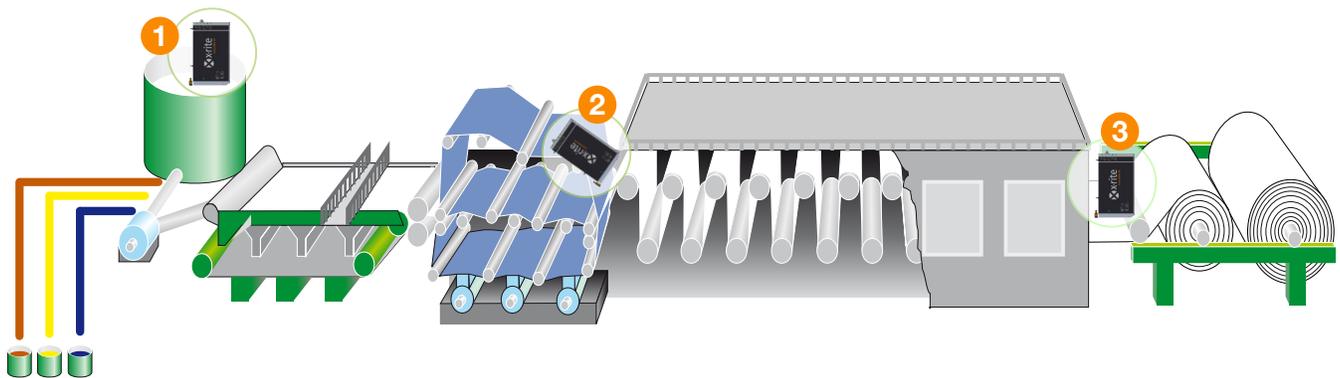
- Measurement is unaffected by ambient light, dust, and normal web fluttering
- Maximize uptime and experience reliable equipment operations with excellent short- and long-term stability
- Can run as a stand-alone system or be integrated with distributed control systems to automatically transfer color values for quality control

Get Up and Running Quickly

- Complete setup on the production machine within several hours
- Start-up and training completed while the machine is producing
- Experience exceptional global support and service from an industry leader in color management

Total Color Control on the Paper Production Line

An inline color measurement and control system includes a non-contact spectrophotometer mounted on a custom frame over the production machine and closed loop color control software to monitor color throughout the run. The inline spectrophotometer can be mounted in three locations.



1 In the Pulp

Measuring the pulp acts like a pre-warning system to notify operators what will be on the machine soon.

Ideal applications: Laminated paper, white paper

2 After the Press Section

Measuring the wet paper before drying offers a good correlation to the finished product.

Ideal applications: Laminated paper

3 Before Reel Up

The most common place for color measurement is before reel up because it offers excellent correlation to the laboratory. By mounting multiple devices, an inline system can simultaneously monitor and control both sides of the paper line.

Ideal applications: Testliner, security paper, colored and white paper, coated paper, tissue, printing paper, pre-impregnated paper

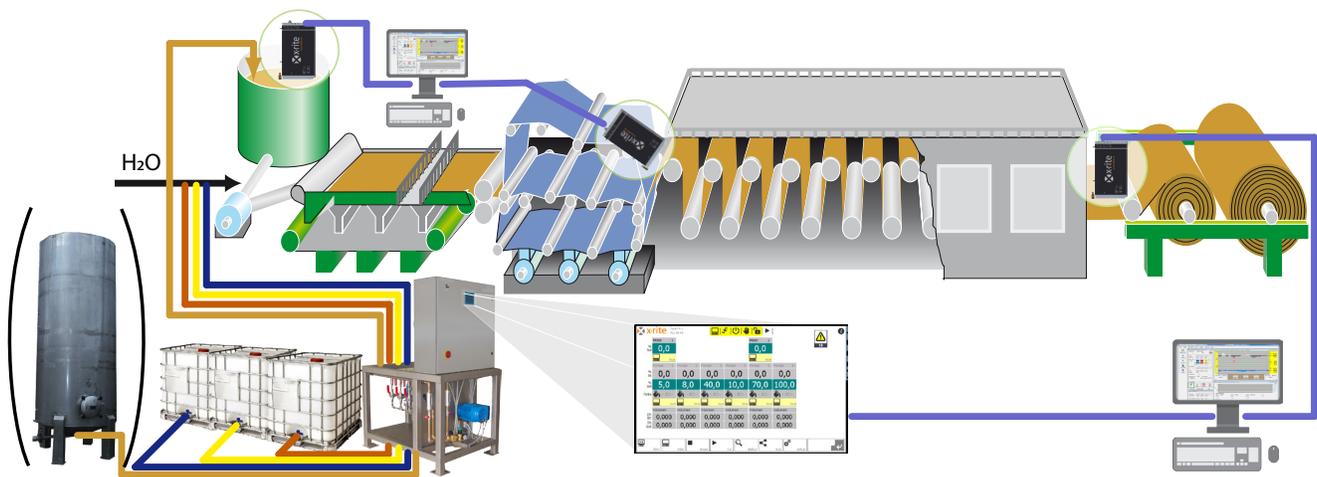
Quality Assurance in the Lab

After the reel up, the operator can pull a sample to take to the laboratory for final product and color inspection using a benchtop spectrophotometer and quality control software. With a ColorXRA 45 inline spectrophotometer installed on the line, and a ColorXRA Lab benchtop spectrophotometer in the lab, the color correlation from the production line to the line can be <0.5 dE, with the right tools and processes in place.

The Ultimate Solution for Accurate Paper Color

Color and brightness are typically the last parameters to be brought into specification at machine startup. An inline color measurement and control system uses a mathematical model to calculate the color changes for up to 3 dyes and optical brightening agents (OBAs) if required as the operators set up the machine. This saves a lot of time during start up and shade/grade change.

If color deviates during production, operators can quickly re-adjust dyes and OBAs to get back on target, reducing colorant and paper waste for a more sustainable process.



On the Production Line: The ColorXRA 45 inline spectrophotometer mounted on a custom EFX measurement frame and ESWin Closed Loop Color Control software

The Benefit of Using a 45°:0° Device for Paper Manufacturing

Traditionally, the paper industry has used sphere spectrophotometers in the lab, which measure color without considering surface effects. This can lead to misunderstandings with printers, who typically measure using 45°:0° spectrophotometers. X-Rite's inline and laboratory spectrophotometers both measure using 45°:0° geometry, which better correlates with human vision and print specifications for clearer expectations.

Maintain the Tightest Tolerances Throughout Production

To measure and monitor color on the production line, X-Rite offers the ColorXRA 45 non-contact spectrophotometer, a custom measurement frame, and ESWin Closed Loop Color Control software to calculate and carry out automatic dye adjustments.

ColorXRA 45 Inline Spectrophotometer

With standardized 45°:0° measurement geometry and spectral resolution of 1 nm, the ColorXRA 45 correlates with lab measurements to minimize color variations.

- Measures base color and optical brighteners separately for optimal control over each component, even when base weight or opacity change.
- Uses real dual beam measurement and automatic wavelength calibration to ensure exceptional measurement accuracy and stability.
- Warns of issues that could impact final color using temperature and dirt detection sensors.
- Maintains measurement accuracy without impact from ambient light, web speed, and normal flutter.
- Only requires external calibration every four weeks.
- Records and stores all color quality documentation for future evaluation according to ISO 9001.

EFX Measurement Frame

The ColorXRA 45 is mounted on a custom frame at 10 mm over the production line to detect even the smallest color deviations.

- Custom built for any paper machine.
- Moves the device out of the way at paper breaks.
- Uses a backing arm to stabilize the web and take opacity measurements.
- Covers white backing for protection and cleans before use.

ESWin Closed Loop Color Control Software

When used with the ColorXRA 45 inline spectrophotometer, ESWin Closed-Loop Color Control software returns results in easy-to-interpret graphic displays and/or printed reports so operators can monitor color and make fast changes if it starts to shift.

- Controls the ColorXRA 45 to take color measurements.
- Automatically regulates up to 3 dyes plus optical brightening agents.
- Manages additional dyes in manual mode.
- Provide test certificates for proof-of-batch quality and diagrams of color deviation.

Validate Compliant Color in the Lab

Inspecting color before shipment is critical for customer acceptance. X-Rite offers the ColorXRA Lab benchtop spectrophotometer and ESWin QC software to help laboratory professionals evaluate final color and track quality according to TAPPI standards.

ColorXRA Lab Benchtop Spectrophotometer

See real-time production measurements and trend graphs in the lab.

- Measures with or without UV with built-in xenon flash lamp, adapted to the D65 standard.
- Measures base color, opacity, and OBAs to ensure industry compliance, including M1 and M2.
- Detects dirt and temperature dependencies with sensors to warn of issues that could impact final color.
- Records and stores all color quality documentation for future evaluation according to ISO 9001.
- Ensures exceptional measurement accuracy and stability through dual beam measurement and automatic wavelength calibration.



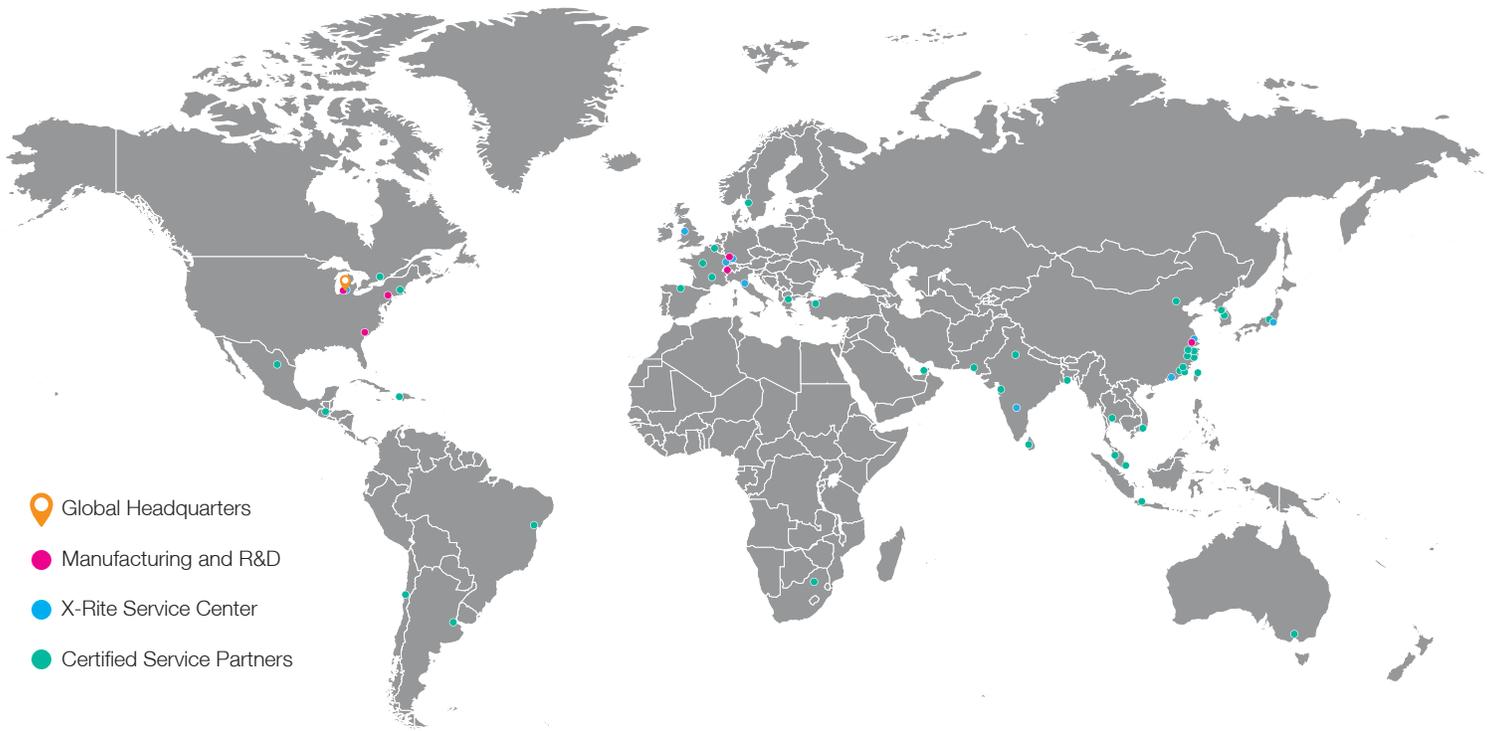
ESWin QC Software

When used with the ColorXRA 45 spectrophotometer, ESWin QC software stores color specifications and compares measurement results so operators can identify emerging color issues and make critical production decisions.

- Evaluates optical brightening agent content.
- Displays color measurement data in an easy-to-understand trending format.
- Generates reports, manages data, and archives instrument diagnostics for improved operational management.
- Works as a standalone system or can be connected to Data Control Systems.
- Identifies areas of improvement for a more sustainable process.

Your Global Color Partner

We recognize that great color portrays great quality and know that your success hinges on the consistent and accurate production of this color. With so many places for color to go wrong, it can be hard to know how to get it right. That's where we can help. By blending the art and science of color, we help you achieve the highest level of color integrity so your product – and your customer's product – comes out ahead.



End-To-End Solutions

We provide solutions that span the entire workflow, from design through production, to ensure your color is optimized.

Innovation

Bridging the gap between color and appearance, we are blazing the trail for you to take your color operations to the next level.

Experience

With 60+ years of experience in color manufacturing, our expertise spans a range of industries.

Passion

Inspired by the great color our customers produce, our X-Rite color team provides quality support and training services.

Call **888-800-9580**
or visit **www.xrite.com**

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