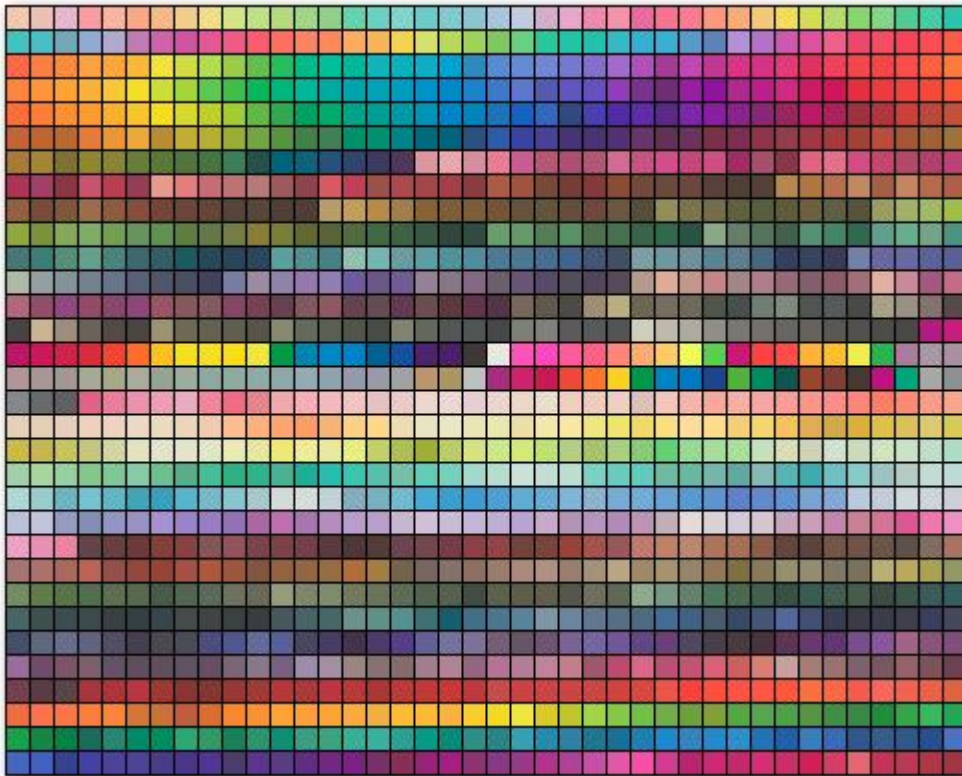


My years in the printing industry taught me one thing—color matters. But when you're working with ink, color matching is a challenge, especially if you have high standards. Ink color density plays an important role for in-line color printing and has a direct effect on color uniformity and final outcome. Color density measurement can be achieved in several ways, of course, but spectrophotometers are the most versatile option for advanced control and quality.

Many major print media and label corporations are unaware of their options—or the capabilities of spectrophotometric instrumentation. As product supplies and industry needs continue to change, new innovations in spectral technology are keeping pace. And since challenges in ink color density measurement can affect many areas of product development, instrumental analysis is a key method of staying competitive in a growing market.



Ink color options and combinations are endless, so special attention must be paid to mixing and matching inks. Ink color density directly affects color outcome, and careful measurement of both density and color are necessary to achieve desired results. Image Source: Flickr CC user ben [deleted]

Looking Beyond Density Measurement

Although density measurement does provide quantitative data on color, it's only a small piece of what is actually perceived by the human eye. Because [many factors affect color perception](#), density measurement alone is subject to visual discrimination. Densitometers also use absorption measurements, which only provide limited data on color changes and uniformity¹. Although this technique can be effective when determining ink film thickness or when contrast monitoring is needed for performance feedback, it is limited in providing color data for quality control assessment.

Spectrophotometers offer a more comprehensive evaluation of color that correlates directly with human visual perception. Rather than using only one viewing angle and light source, spectral technology integrates various geometric principles and optical pathways to achieve the best representation of color data—regardless of the medium being used. Since

spectrophotometers account for ink properties as well as application processes and types of paper, they are able to monitor reflectance values and saturation levels, providing the additional information needed to achieve highly accurate results. Given the increasing number of specialized materials used by the printing industry, this capability is especially important. From high-gloss or matte finish papers and inks to UV formulations, spectrophotometers offer much-needed versatility.



Many printing applications that are used outdoors require inks that can withstand prolonged exposure to the elements. Spectrophotometers effectively measure UV resistance, assisting in the development of advanced UV ink products. Image Source: Flickr CC user Justin Taylor

Utilizing Spectrophotometric Instrumentation

The number one priority in the printing industry is keeping the customer happy. This requires an agreement on color standards between ink supplies and printing companies so that consumer expectations can be met. In an interview with *Ink World Magazine*, Michael Impastato, vice

president of market development at Flint Ink Corporation states that “printers are looking for colors that match their customers’ expectation. This involves more than color matching. First, the printer and the ink maker must establish a good color standards program. The color standards have to be agreed upon by all parties: the customer, printer and ink maker. These ‘approved’ standards become the bible”². And color matching that spans all levels of manufacturing requires instrumental analysis. Spectrophotometers combine the highest level of color technology with integrated software, allowing you to analyze and store data for consistency and repeatability. Spectral instrumentation can then be used to develop a [color tolerance standard](#), which is the best way to effectively communicate color standards between all parties.

Quantifiable color data not only assures color agreement—it can be used to monitor processing changes throughout production. Spectrophotometers utilize reflectance and transmittance measurements to define color space values, which can be translated using systems such as CIE L*a*b* or Hunter Lab. And with advanced technology, assessment of both liquid and solid ink samples is attainable and can provide [instant data on color variations](#). By comparing a sample to a color standard, operators can instantly identify whether it falls within the acceptable color range, ensuring batch-to-batch and lot-to-lot consistency.



Color clarity and design elements must be consistent from batch to batch to ensure functionality and customer satisfaction. Image Source: Flickr CC user Rusty Clark – On the Air M-F 8am-noon

Options in Color Assessment and Instrumentation

Advancements in color technology have led to innovative solutions in [ink color analysis and print media assessment](#). Instrument options such as hand-held or bench-top models provide the portability and durability needed for industrial use, while in-line process monitoring systems provide

the consistent data needed for high-speed production. And thanks to instant data, each color measurement tool is designed to allow real-time adjustments, saving both time and materials.

HunterLab is a leader in spectrophotometry and innovative design. We offer solutions for every aspect of the printing industry, with instrumentation options available to meet any budget or need. Our color measurement tools are top of the line and simple to use. We work together with our clients to help them make the most of their color measurement instrumentation and address any challenges they may have. [Contact us today](#), and let us know how we can help you increase customer satisfaction and the quality of your products.

1. "Densitometry and Spectrophotometry",
http://www.densitometers.net/pdf/densitometry_and_spectrophotometry%2004.pdf
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