Esko
color management

Esko's color management solution is built on 4 pillars that deliver more value in packaging production. Find out why the Color Engine is the logical choice for packaging printing.

4 reasons to work with Esko Color Management

1. Spectrally based
2. Predict real ink on substrate
3. Address today's color challenges
4. Totally connected

ESKO

4 reasons to work with Esko color management

The Esko Color Engine has been built on four technical pillars that deliver value in packaging production:

1. **Spectrally based.** The Color Engine captures all information on the ink and process, as a foundation for steps 2, 3 and 4. (Read more on page 4)

2. **Predict real ink on substrate.** The Color Engine's algorithm predicts behavior of special inks which allows accurate proofing and production. (Read more on page 5)

3. **Address today's color challenges.** The Color Engine enables an accurate and simple workflow for digital printing and expanded gamut workflows. (Read more on page 7)

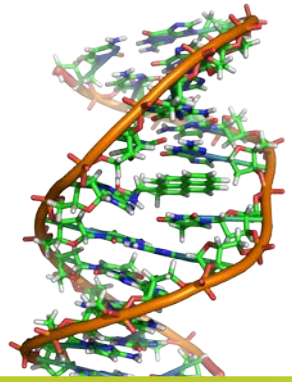
4. **Totally connected.** The Color Engine allows users to share color assets within the workflow and along the supply chain to avoid errors and duplicated effort. (Read more on page 9)

The Color Engine is integrated in a broad variety of products: from proofing systems, to editing and retouching tools, to digital front ends (DFE) for a range of digital presses.

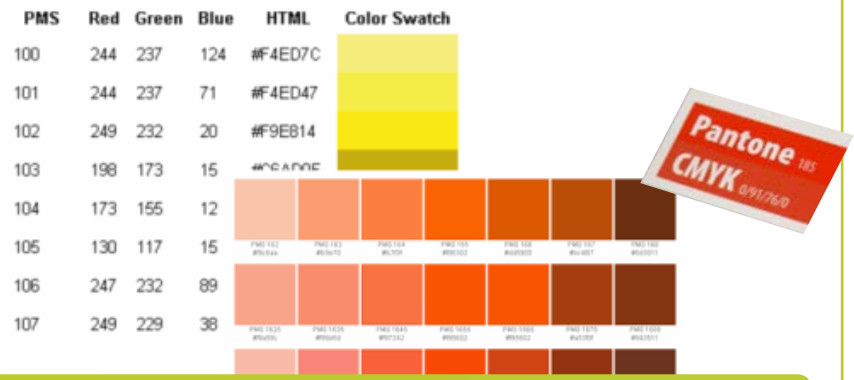
In all these applications, Color Engine underpins color processing with the four technical pillars above, leading to a sound workflow with results fit for packaging.

This makes Color Engine the only logical choice in a packaging workflow for digital or analog print production.

4 reasons to work with Esko color management

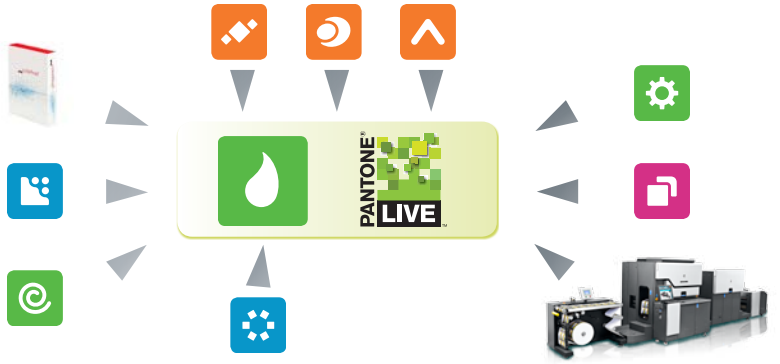


1. Spectrally based
The Color Engine captures all information on the ink and process.



2. Predict real ink on substrate
The Color Engine's algorithm predicts behavior of special inks which allows accurate proofing and production.

3. Address today's color challenges
The Color Engine enables an accurate and simple workflow for digital printing and expanded gamut workflows.



4. Totally connected
The Color Engine allows users to share color assets within the workflow and along the supply chain.

Reason 1: Spectrally based

The Esko Color Engine is based on spectral color data. Spectral data is the only true way to characterize a color, independent of lighting and of observer and instrument, capturing information on how that color is built up.

Spectral data consists of a series of samples of the colored object or ink, taken at precisely known points in the visible light spectrum.

More accurate than Lab color data

Most color management systems are based on “Lab” (pronounced “L” “a” “b”) color data. Lab is a system that uses three numbers to encode how a color appears in a specific lighting condition and to a specific observer.

It is a good way to define color references in such known conditions, and also as a basis for color differences and tolerances (“Delta E” values, which are calculated in Lab space).

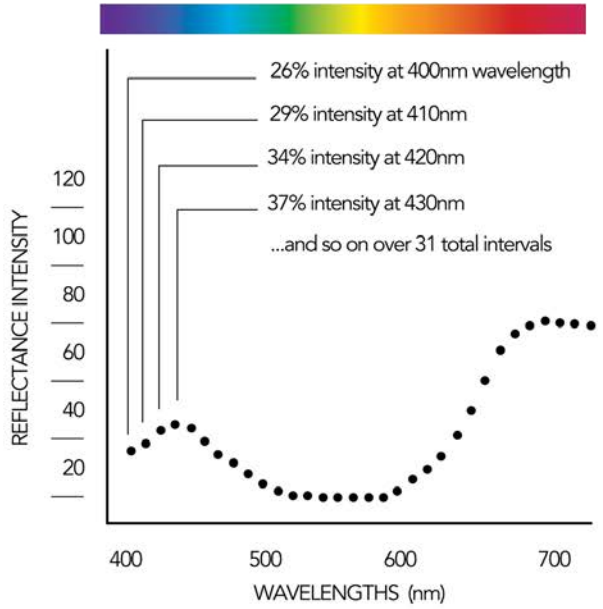
Spectral data is a fingerprint of the behavior of the color across the whole visible light spectrum and so captures much more information about the color than a simple Lab measurement.

From spectral data, the Lab value of the color in any lighting condition can be calculated, but the reverse calculation is impossible. Software and processes that need to take into account the behavior of a colored object across a range of lighting (such as ink formulation) rely on spectral data for proper operation.

The foundation stone for ink behavior

Spectral data is also the foundation stone for calculation of ink on substrate and ink on ink behavior as explained in chapter 2.

Packaging uses a wide variety of inks and substrates and customer requirements and measurement conditions may vary widely. Capturing and managing the maximum amount of data (the spectral data) at source makes total sense.



Reason 2: Predict real ink on real substrate

Most printing in the world is done with a standard four-ink set CMYK (cyan, magenta, yellow, black). In packaging, however, this does not give the color range ("gamut") and shelf impact demanded by the brand owner.

Hence special inks ("spot colors") are widely used in packaging. These inks vary from job to job depending on the brand, with a typical printer having a library of hundreds of inks in use.

In addition, packaging makes use of a variety of printing processes including offset litho, flexo and gravure.

Predict ink behavior

To be able to set expectations throughout the packaging supply chain means that the behavior of special inks needs to be predicted with a high degree of accuracy.

This is necessary to create soft and hard copy proofs, virtual and physical mockups and to make accurate color separations in prepress.

It is impractical to measure ("profile") every combination of special inks though in practice these combinations will occur on many packs, when a special ink overprints another ink.

Spot color overprint model

To address this challenge, Esko developed the first commercial "spot color overprint model" in a packaging workflow, more than 10 years ago. Using spectral data about each ink, the behavior of ink overprints can be predicted, for example in hard copy inkjet proofs for the designer, brand owner or prepress operator.

An accurate prediction enables expectations to be set and any color changes to be made digitally to the packaging long before it reaches the printing press.

Reason 2: Predict real ink on real substrate

Ink profiling

The ink profiling information may be captured by printing a fingerprint chart, which requires only the special ink to be printed in combination with black ink (so that its opacity can be measured).

The ink model can even derive useful information from a simple gradation strip. This requires only that the ink itself be printed without additional inks in combination. Often this kind of chart is already available from a production file (control strip) or from an ink drawdown or ink standard.

Accurate ink modeling for analogue and digital printing

Avoiding color correction on press saves time and cuts out errors and rejected jobs at the printer, as has been proven over many years. Esko has further improved the spot color overprint model in Color Engine in order to give even more accurate results adapted to the specific printing processes used in packaging, such as flexo.

Even when the Color Engine is used in digital printing applications (where special inks are seldom employed) the accurate ink modeling of Color Engine has value.

In many cases, it is a requirement that the digital print match an analog print from a previous press run (in flexo, for example) – in this case the Color Engine can provide a calculation of the analog press color result and apply this to the digital print output to achieve a match.

Reason 3: Address today's color challenges

As stated above, most packaging today is printed with combinations of special inks. It is, however, not practical to use special inks on a digital press.

Digital printing is designed to be economic for short run printing and variable data – this does not fit with having to change special inks for each job.

It is not acceptable either to stay with standard CMYK printing on a digital press: the range ("gamut") of colors with CMYK is not sufficient to print many brand colors.

Expanded gamut

That is why many digital presses employ an "expanded gamut" ink set of six or seven inks, such as CMYKOG (CMYK plus Orange plus Green) or CMYKOGV (CMYK, Orange, Green, Violet).

Using such a fixed ink set provides a large enough gamut to print most brand colors, and allows for a quick job turnaround since the same inks are always used.

Printing with six or seven inks does pose new challenges in color management. The industry standard profiling method ("ICC profiling") has severe limitations when working with more than four inks, and hence does not produce very accurate results when used in expanded gamut applications.

Using spectral data

Esko designed its system around the smart use of spectral data, accurately sampling only the useful sectors of the press color space. Even when seven inks are available it is unlikely to be beneficial to render any specific color out of more than four inks and in many cases three inks give the best result.

Reason 3: Address today's color challenges

The Esko Color Engine takes into account the printability factor as well as simply color accuracy to a ΔE formula.

Color separation has to be smooth, especially in blends or images originally expressed as PANTONE® or other custom inks that are being converted to a six or seven color digital process.

The number of inks used in any rendered color area has to be optimized since a more stable result in printing is obtained using fewer inks, but ones that are closer to the original target color.

The effects of halftoning (screening) have to be taken into account, since moiré patterns could result when using multiple inks with the same screen angle. Small percentages of ink, for example less than 5% with certain print processes, need to be optimized away to avoid a grainy appearance or unstable printing.

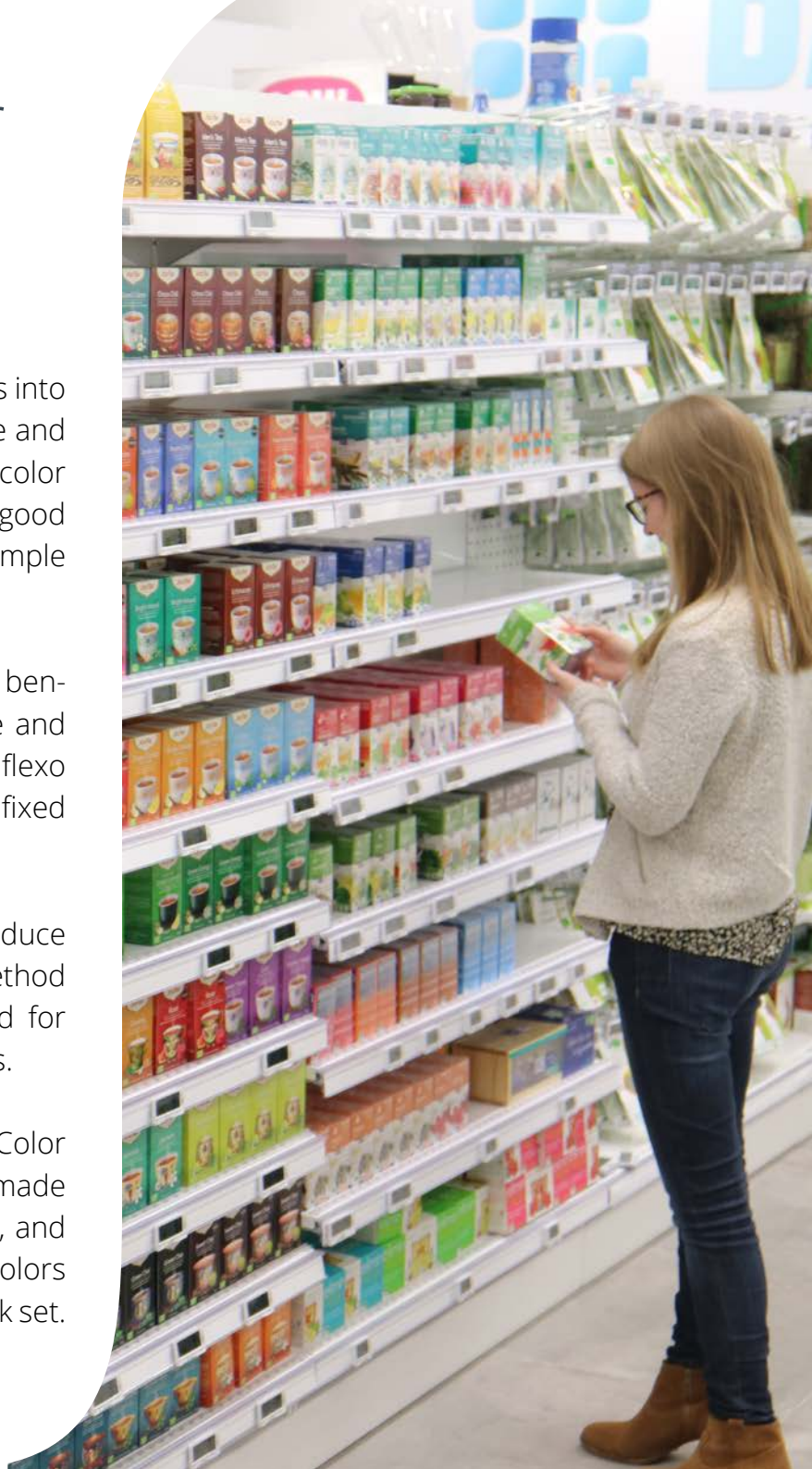
Accurate brand color reproduction

Esko Color Engine takes all these factors into account, hence it can produce accurate and stable color results for six and seven color digital presses with ease, leading to good reproduction of brand colors and a simple workflow.

It is not only digital printing that can benefit from this. Advances in press, plate and prepress technology have allowed flexo and offset printers to also employ fixed "expanded gamut" ink sets.

Entire factories have been set up to produce packaging using an analog printing method and a fixed ink set, avoiding the need for special colors and ink changes on press.

Esko "Equinox" software (powered by Color Engine) enables accurate proofs to be made in this workflow before going on press, and jobs previously printed using special colors can easily be converted to use a fixed ink set.



Reason 4: Totally connected

Color is not managed by just one operator, at one step in the workflow, or by one organization or stakeholder in the packaging supply chain.

The production of packaging involves multiple actors, and each must take care to manage color information correctly to produce an optimal result.

Within one team (such as a prepress department) multiple operators need to work on color data in files, accurate proofs have to be produced and final separations need to be made for plate-making and/or printing.

Effective color communication

Effective color communication is vital. All operators in the team, and all stakeholders in the supply chain, must be working with a common set of data. Disconnected workflows lead to duplication of data entry, errors and missed expectations.

The Esko Color Engine provides a central database containing all relevant color assets such as profiles, brand color definitions and color strategies (collections of workflow settings).

When new brand colors are developed, or colors are changed, all operators and workflow steps immediately have access.

Connect to PantoneLIVE

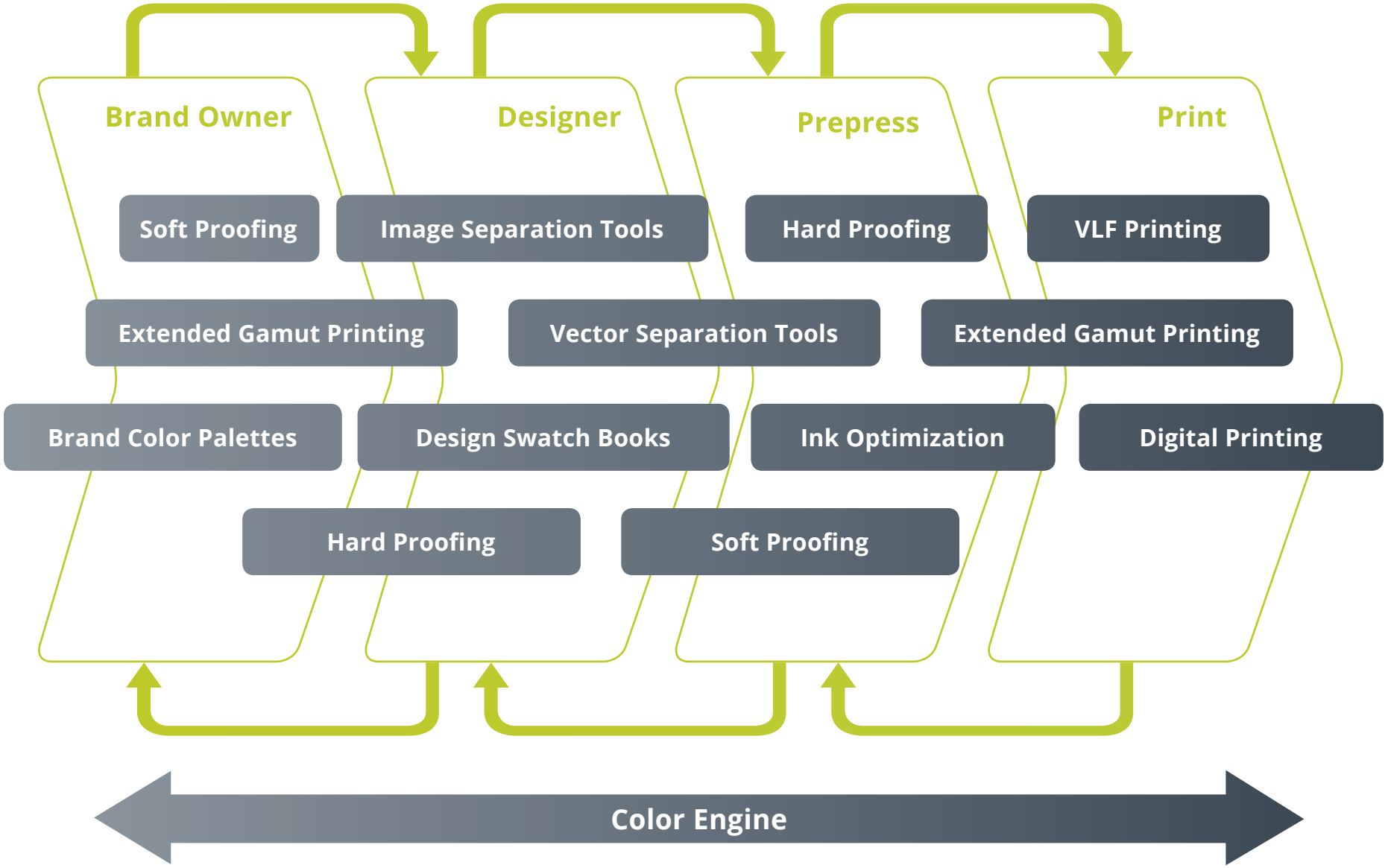
Color Engine was also the first production workflow to be connected to the PantoneLIVE cloud.

PantoneLIVE provides a library of brand color definitions defined as real ink on real substrate. These libraries are available in the cloud, so they are accessible from anywhere yet controlled by a secure login and digital rights management system.

All actors in the workflow, from brand owner and designer through to ink formulation and printing are synchronized to a common definition of color.

Communication of color within a workflow using Color Engine database, or across the whole supply chain using PantoneLIVE promotes consistency and accuracy by making sure that all components and actors are working to a common definition – without this, errors and mistakes can be inherent and undetected.

Reason 4: Totally connected



Want to know more?

Esko's Color Engine is color management with packaging at its heart. Want to know more?
Contact us at info.eur@esko.com **or visit us at** www.esko.com**.**

" Standardization and proofing of process colors were made possible with the Esko solutions.

- RAKO ETIKETTEN
- Stefan Behrens, Prepress Manager

" Matching colors with Esko tools, our customers are confident with our proofs.

- NORTH STATE FLEXIBLES LLC (US)
- Hugh Farrell, Prepress Manager

" With Esko we are usually able to match proofs on press with quick, minor tweaks.

- LONE STAR CORRUGATED CONTAINER CORPORATION (US) - Joe Phipps, Prepress

" We're reputed for delivering absolute colour quality and consistency towards brand owners. The partnership with Esko has only intensified our expertise.

- DSN
- Erik de Cloe, Director Operations

" With Esko's solution we can quickly and easily share color information. This saves many hours previously required for color conversions and retouching.

- VCG CONNECT
- David Piercy, Production director