July 2015 · No. 1

SIEGWERK

COLOR NEWS

Business Unit Sheetfed

FASTMatch™ On-line Colorimetry

In the digital era, FastMatch is the solution that allows you to store, enrich color libraries and exchange color data via a central server.

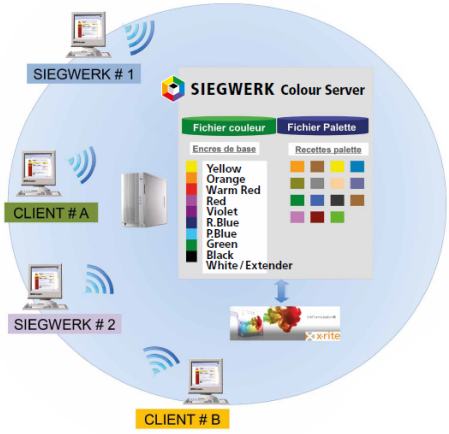
The color data (ink sets, formulas, color standards ...) are now accessible anywhere with an Internet connection.

When connecting to the server, an access control guarantees the protection and confidentiality of data between our BU. The system is regularly updated to new color formulas that are developed in our different European sites. They are referenced in the basic on-line data instantly and are immediately accessible to all users.

The storing of a known formula or a formula called «Palette» will yield the precise recipe but also its referent color. The enrichment of libraries digital formulas in «palettes» makes the system FastMatch always more effective and faster in the process of colormatching.

3 European pilot sites have been experimenting this new system for nearly a year.

Today this promising solution is in the deployment phase across all our European blending centers and in Russia. In future, it will also be open to our customers, allowing them to access their own customized color databases. The measured color saved on this common platform will also have the advantage of facilitating intra and inter-company exchanges.



Indeed, on-line measurement is very fast. With a few clicks, the spectral curve, which is the true color identity, will be available on the server. Eventually, the exchange of physical standards will no longer be necessary, and we shall benefit from a considerable time saving.

How to equip a colorimetric lab?

Ink formulation & color quality control software

✓ Xrite IFS6 version «Printer Pro» (includes CQS6) or manufacturer

Spectrophotometer

✓ Xrite- Exact Standard version – 45/0° for all applications except metallized substrates

✓ Xrite – Ci6x series – Spherical geometry for specific application: metallized substrates

Scale for recipe weighing

✓ Mettler Toledo

Maxi. Range: 3 kg – accuracy 0,1 mg

Analytical scale for grammage control

✓ Mettler Toledo

Maxi. Range: 220 g – accuracy 0,01 mg

Proofing machine

✓ IGT – C1-5 for conventional & UV offset inks

✓ Flexiproof100 UV for flexo UV inks – Erichsen

UV dryer

✓ Aktiprint – Technigraf

Hand coater for OPV application – Erichsen

✓ HC0 for UV varnish

✓ HC1 for water varnish

Light Booth for visual color control – BYK Gardner

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What are the means available on the market to calibrate our spectrophotometers?

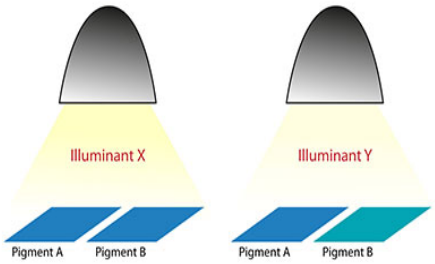
Supplier/ Service provider	Description	Process	Leadtime	+	–
XRite	Package certification & preventive maintenance	Return instrument center After-sales service/Germany	5 to 7 working days	Certification done by the manufacturer	Time constraints
XRite	Annual maintenance contract «Full service»	Return instrument center After-sales service/Germany	5 to 7 working days	– Annual unlimited repairs – 1 Certification/year – 1 loan instrument based upon availability – Shipping back costs supported by XRite – Priority to the after-sales service center	Time constraints
XRite	Calibration via Netprofiler3	Calibration software	30 min/instrument	26 possible measures/year Speed No instrument exchange to predict	This system is not proposed for spherical geometries
Lab Service	Package verification, cleaning, calibration and certification	Sending of the device to the service provider lab or technician intervention on site	**Intervention in laboratory:** 1 to 2 weeks after device reception. **On-site intervention:** 30 min/instrument	Certification based upon manufacturer procedure **On-site intervention:** Speed	Lab intervention: time constraints On-site interventions: Minimum of invoicing: 750 € HT

Illuminants & Metamerism

Illuminant = standardized and reproducible light source whose spectral characteristics are defined by the CIE (International Commission on Illumination).

A printed edition may comply chromatically speaking in an event when observed under a standard illuminant, but can sometimes show noticeable differences in color seen in a different light source.

We must not forget that the final printed product will be considered in various lights (the sun, under neon lights, incandescent bulbs, etc.), which brings additional stresses during color development.

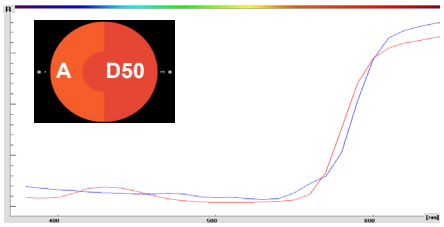


Metamerism = optical phenomenon that makes two objects have the same color appearance under a given illuminant, but return different colors in a different light.

To ensure consistent color production, the actors of the graphic chain: from designer to printer, should always work under a standard light (5000 K = illuminant D50).

By comparing the spectral curves of the color to be reproduced with that of the counter-typing, the colorist is able to determine if there is a risk of «metamerism»

Indeed, if the curves intersect, the pigment compositions are probably different and can create metamerism issues.



Iluminants:
A: TDC = 2856K* represents a domestic lighting, «Tungsten filament»
D50: TDC = 5003K «Light the horizon»
D65: TDC = 6504K «noon Daylight»
F1 to F12: 12 types of «Fluorescent light» which differ in the combinations of gases used
F2: Also called CWF (Cool White Fluorescent), CCT = 4230K, this light forms the majority of desk lamps

The 3 keys to a successful formulation system – optimum color sets

1 Optimal pigment selection

2 Selection of standard inks for the production of draw-downs

3 Huge accuracy during the preparation: weighing, consistent ink film weight

4 Reliable and calibrated devices

5 Standardization of proofing methods and substrates

DE$_{CIELab}$ vs the acceptability Formula DE2000..

The human eye is not equally sensitive depending on colors.

A color acceptability formula has been developed to take into account the sensitivity of the human eye, and to provide results more in line with the visual perception.

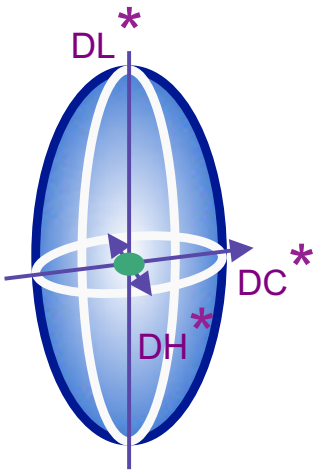
CIE1976 was one of the first attempts to develop a uniform color space … unfortunately it does not correlate well with color visual assessment.

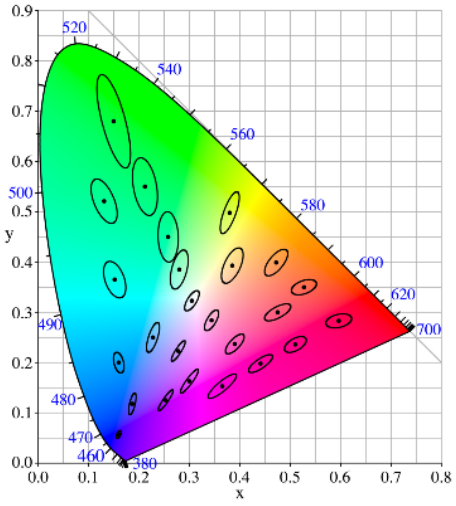
As a consequence a CIE1976 color Pass/Fail information is rarely in line with visual decision.

- Depending on the color, a given DE* (= DECIELab) value is never corresponding to the same visual color difference.
- There is no fixed DE* value to specify color difference just visible by eye.

In fact, humans are respectively more sensitive to:

1. Hue deviation … the DH* value
2. Saturation deviation … the DC* value
3. Lightness deviation … the DL* value





This is the reason why Color Acceptability Formulas were developed.

- DE2000 provide better correlation with visual assessment, due to an ellipsoid defined around a standard color with semi-axis corresponding to Hue, Saturation and Lightness.
- The ellipsoid represents the volume of color acceptance and automatically resizes depending on the position of the standard color in the color space. Main advantages are:
  - Whatever the color is, a given De2000 is corresponding to almost the same visual color difference.
  - As long as DE2000 value is close to 1, color difference should just be visible by eye. By the way, do not mix-up VISIBLE and ACCEPTABLE.
- DECMC was an intermediate version close to the DE2000 but has a bit less correlation to eye perception since it does not take the hue value into consid eration.
- Control Quality software loaded into spectros allows the automatic passing from one DE system to another by simple calculation.