

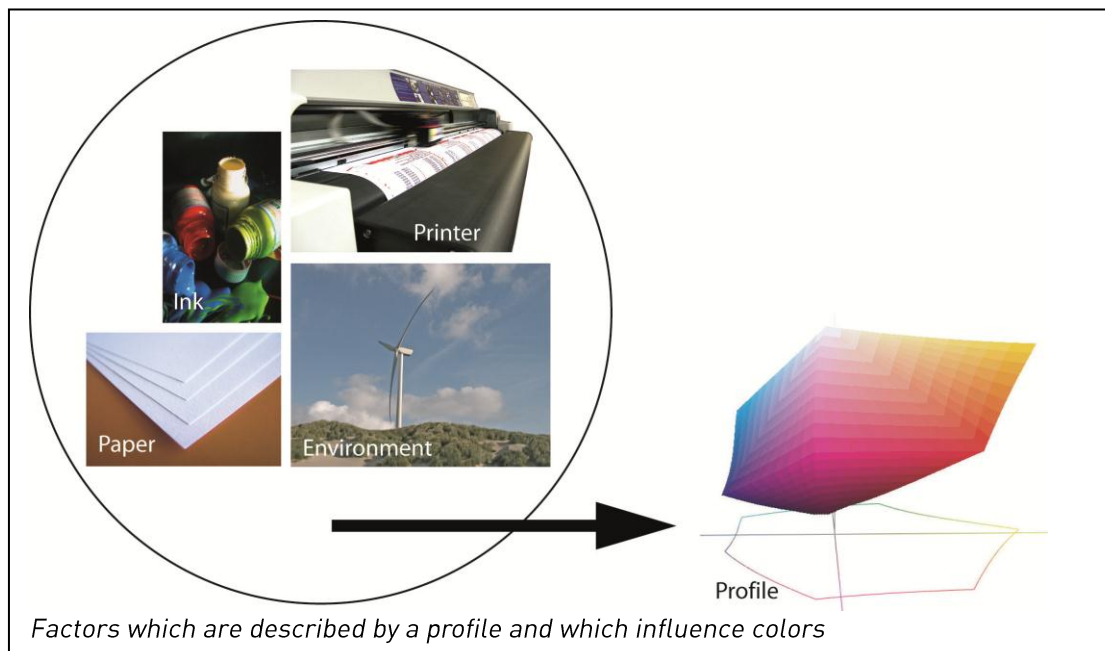


Color Management in Large Format and Flatbed Printing

The digital Large Format and Flatbed Printing is one of the most fast growing markets as continuously new printers, inks and media appear on the marketplace. The creativity of advertisers thanks to these new technologies is almost unlimited and always new applications arise. 'Corporate identity' and 'color-true' also in large format printing are not any more buzzwords and nowadays they play a fundamental role in the whole visual communication. This can be guaranteed with color management and therefore 'Color Management' is one of the keys to success.

Customers expect their advertising to have the same colors no matter whether they are on a banner covering a whole building, in a light box at the bus station, wrapped on a car, printed on a window or on the packaging of their products. If colors do not match, customers will complain and refuse to pay for printer's hard work.

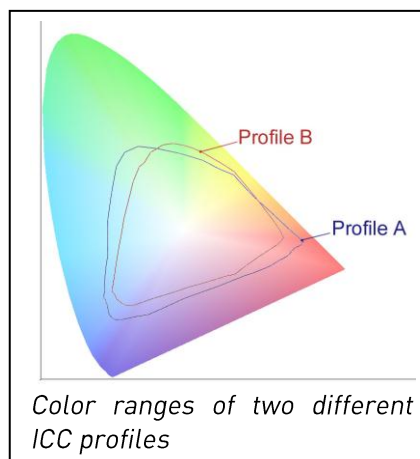
Everyone who is involved in the large format printing recognizes every media has different characteristics which influence color appearance; printers change after ink replacement, maintenance service or print heads replacements. Also temperature, humidity, and atmospheric pressure are factors which to a certain degree influence the color appearance. Ways to capture an image (photo camera, scanner etc.), used software for image correction, and used equipment to visualize the image are also crucial issues.



Especially in large format and flatbed printing there are factors which definitively are not negligible: RIP software, ink, and media. The RIP influences the colors as it is responsible for the linearization of the printer, the way dots are printed (stochastic, contone...), the amount of overprinting etc. The ink as there exist so many different types of them (UV, dye, different types of solvent, latex etc.) and all of them have different color appearance. The media is the most crucial component as almost every day appears new ones on the market and all of them have different characteristics. I. e. the white point of the media influences the color appearance as an image printed on cardboard will not be the same as on paper, glass or

textile. Besides of the white point also the trapping is important. If a media absorbs a lot the ink, the colors will change in comparison to not absorbing media. This has an influence especially on the saturation. Also the surface or structure of the media must be considered. And finally the printer itself influences the color appearance and stability in the medium / long run. Especially after print head replacements or service interventions printers tend to shift and show different colors.

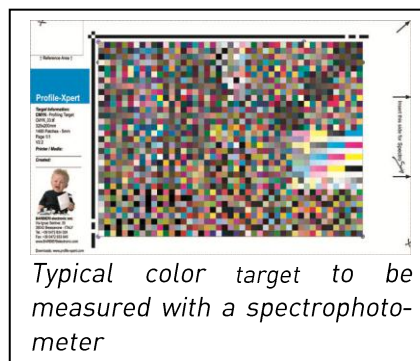
Besides the technical related factors also the operator working on the printer influences the colors. Most times colors inside the images will be edited in order to match the original as good as possible.



All the above mentioned factors cannot be looked at separately but have to be handled as a whole.

In the past and very often still today most printing laboratories work according the approximation technique: they print a sample, change the colors on the computer and print it again. This procedure they repeat until they reach the result desired or at least a good-enough quality. The disadvantages therein are on hand: waste of media, waste of ink, waste of operators' and printers' time – waste of money!

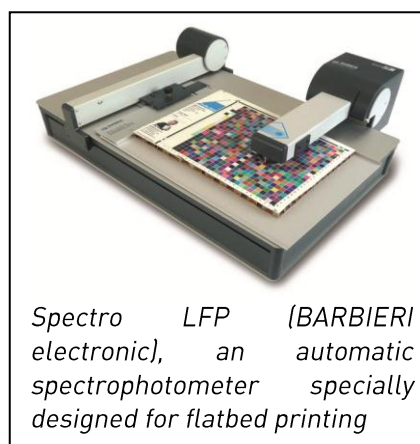
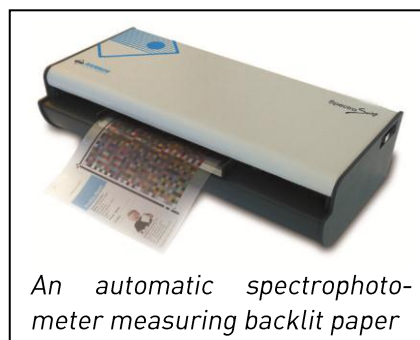
This fact has been recognized by many media and printer suppliers which in order to support their customers together with their products deliver generic ICC profiles. These generic profiles have been created at supplier premises with their printer, their media, their ink, at a specific humidity and temperature. The created ICC profile will describe exactly this combination. The same combinations at customer's premises will never appear and therefore a generic ICC profile will never give satisfying results. But this is already a first attempt to approach this matter.



The best and only working way to get really color-true outputs will be customers create their own individual ICC profiles. These profiles describe the actual printer – ink – media – environment combination for the specific printing lab.

Here for every printer condition (dpi, speed etc.) and used media combination an ICC profile must be created. Once this has been done the following advantages will be gained:

- Color-true prints (within the gamut of the specific printer)
- No waste of time (printer and operator), media and ink.
- Spot colors (colors of logotypes) can be matched.
- Reprints will have the same colors as the first print.
- The outcome on a printer and specific media



can be simulated on the monitor (see what you will get).

- The whole color space of the printer – ink – media combination will be exploited.
- Color-true outputs on new media can be reached immediately.

The spectrophotometer is the core of every color management solution. This measuring device has to measure the visual color appearance exactly as the human eye will see it.

In the process of color management the spectrophotometer is needed mainly in two steps, the linearization and profiling. The linearization guarantees that the percentage of ink is distributed correctly on the media and that no clipping occurs. The profiling captures the color gamut boundaries and allows calculation of visually perfect gray values and description of printable colors. Besides these two tasks the spectrophotometer will be used also to measure spot colors in order to be able to reproduce them.

The range of products varies from entry models (mainly manual devices) up to professional devices, specifically designed for the large format printing. As the large format printing and flatbed printing market has some very special requirements, not every spectrophotometer is suited.

In order to build a most extensive profile it is needed to read as much color combinations as possible (a big amount of color patches). To measure such big color charts an automatic device is a must. They are fast and the operator in the meantime can perform other jobs.

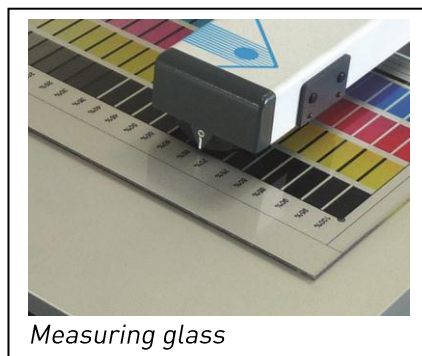
Using manual devices is boring; the operator is busy and cannot do anything else. Furthermore many mistakes can be done which influence the results in a negative way. Especially in UV printing both high and low resolution is used and the measuring device must be able to handle this. For low resolution prints a bigger measuring aperture is needed to average the dots.

The media used is the greatest challenge for every measuring device. There has to be considered the thickness and weight, the surface, the structure and whether the media is opaque or transparent (translucent). Measuring transparent media (such as backlit, film) occurs special measuring devices and only one manufacturer worldwide offers such spectrophotometers. To measure textiles, fabrics or other media with a structured, textured surface a bigger measuring aperture is fundamental.

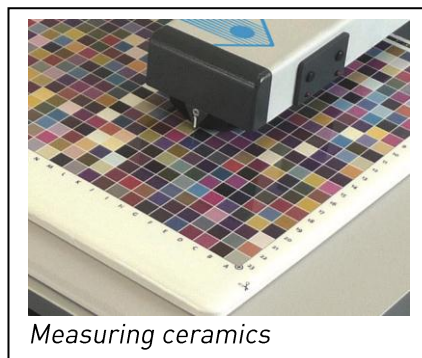
Some inks tend also to be sticky or take very long time until they are fully dry. Therefore the measuring head is not allowed to touch the surface during the measurements as it would scratch the target or measurements would be wrong.

Also the typical characteristic of UV inks (swirl surface due to dot characteristics) influences the characteristics a color measuring device must have. To overcome stray light and reflections the surface must be illuminated from different angles with more than one light source.

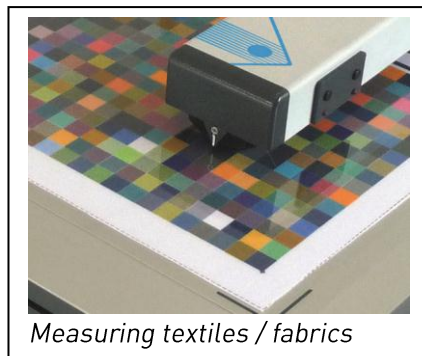
As in large format and flatbed printing most different media will be printed on, a measuring device must also be able to measure all of them. Therefore the ideal spectrophotometer should be an automatic one, it must be able to measure both transparent and reflective media, the measuring aperture should be switchable from small to big and the optics should be studied



Measuring glass



Measuring ceramics



Measuring textiles / fabrics

especially for the needs of Large Format and Flatbed printing.

Besides getting color-true outputs and therefore satisfied customers, Color Management, applied in the right way allows printshop owners to save also money. Solvent ink can be saved between 20% and 25% and UV ink even more. Besides this also media and time will be saved. Basing on this an investment in professional color management equipment within a few months will be paid off, customers will be satisfied and also money will be saved in future.

Wolfgang Passler

(International Sales&Marketing Manager)



*Intelligent Measuring Technology
when Color Quality counts*

BARBIERI electronic snc/OHG
Via I.-Seidner-Str. 35
39042 Bressanone/Brixen - Italy
Tel. +39 0472 834 024
Fax: +39 0472 833 845
info@BARBIERLelectronic.com
www.BARBIERLelectronic.com