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Colour quality testing of cyan offset prints depending on pigment concentration and different CTP screening mode

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Abstract

One of the problems in the offset printing technique is the picking of uncoated paper, which occurs due to the activity of pressure cylinder and sticky offset inks. To reduce offset ink stickiness, it is possible to add cheaper ink filler that will indirectly reduce the concentration of pigment. However, there is also a reduction in the color tones and quality of reproduction. In this experiment we used: standard cyan offset ink (Sun Lit Express ink which consists of phthalocyanine based pigment) and high-quality gloss coated cardboard (250 g/m2 Euroart plus gloss).

This paper aims to show how the CTP screening type (AM/FM mode) and the CTP line screening (80, 100, 120 line/cm and 10 µm, 20 µm 25 µm diameter of print elements) manifest on the reproduction quality of a standard gradation wedge. This research will create the possibility of correlating the factors of user reduction of pigment concentration and reproduction quality of cyan color separation.

By using the AM screenings and adding different concentrations of ink filler, more stable cyan prints are achieved.praesent.

Methods

The paper will examine the quality of cyan prints depending on the filler content. Euroart plus gloss coated paper (250 g/m2) was used as the printing substrate. Before printing, test patches were created using the Kodak Prinenergy EVO workflow (enables control of the preparation process). Each part of the patch was treated separately by determining the type and shape of the raster elements, the line screening, or the fineness of the raster. As a result, all samples were on only one printing sample (AM raster with three different 80, 100, and 150 lin/cm lines and FM raster with 10, 20, and 25 microns).

After screening, the printing form was generated on a CTP Kodak Trendsetter. Before each printing, the inks were changed in the machine, which difference in the percentage of additional filler. This meant that the machine had to be cleaned and re-prepared for printing after each print (four times in total). Four mixtures of cyan inks were used: cyan ink with 0% added filler, cyan ink with 10% added filler, cyan ink with 20% added filler, and cyan ink with 30% added filler. All samples were printed on a two-color offset machine Heidelberg Speedmaster 102/P with a hard offset rubber blanket.

The impression cylinders were dimension B2 and samples were cut into 8 pieces for the work. All samples were measured with an X-rite Exact colorimeter and spectrophotometer. After all tests, the obtained L*, a*, and b* coordinate values were processed in the ORIGIN 9.0 program.

ACKNOWLEDGMENTS

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Results

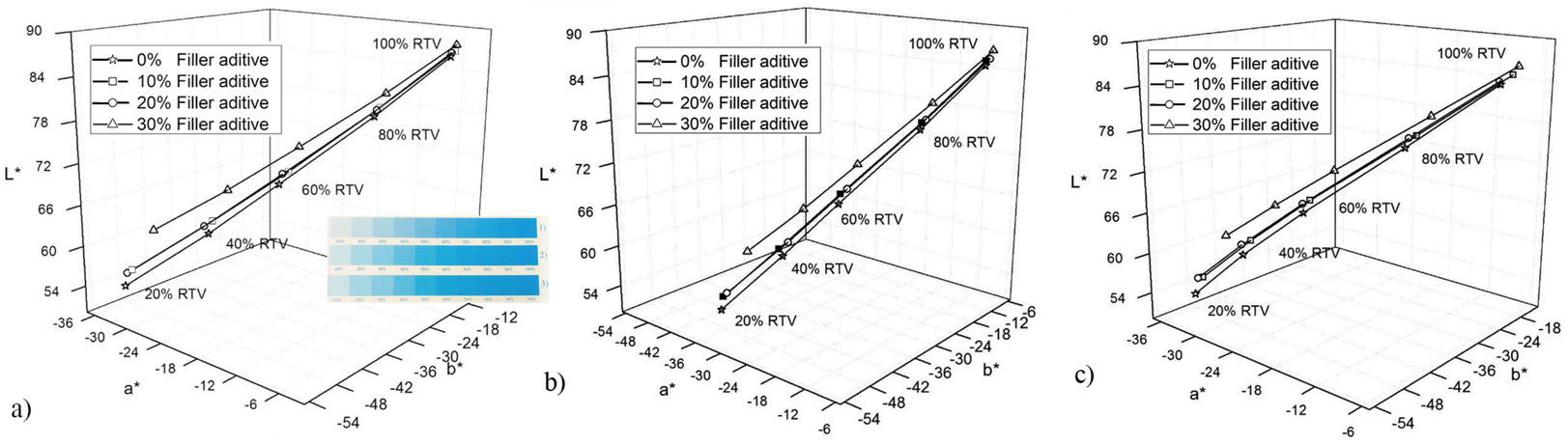

Figure 2. Color change of cyan tones from for FM raster: a) 25 µm; b) 20 µm and c) 10 µm.

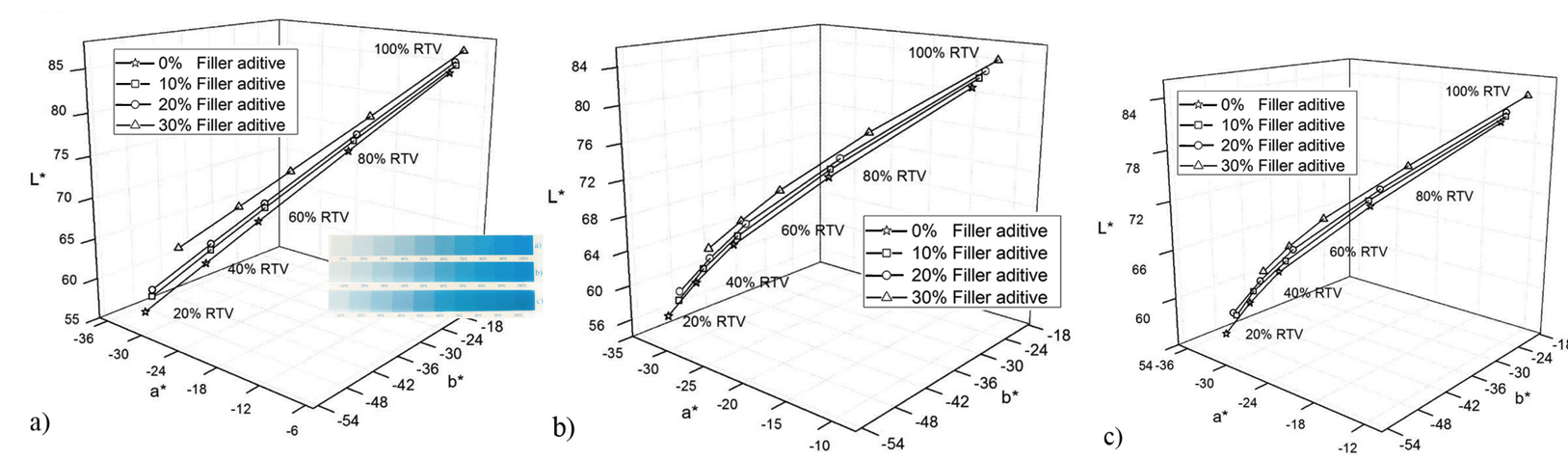

Figure 3. Color change of cyan tones from for AM raster: a) 80 lpc; b) 100 lpc and c) 120 lpc.

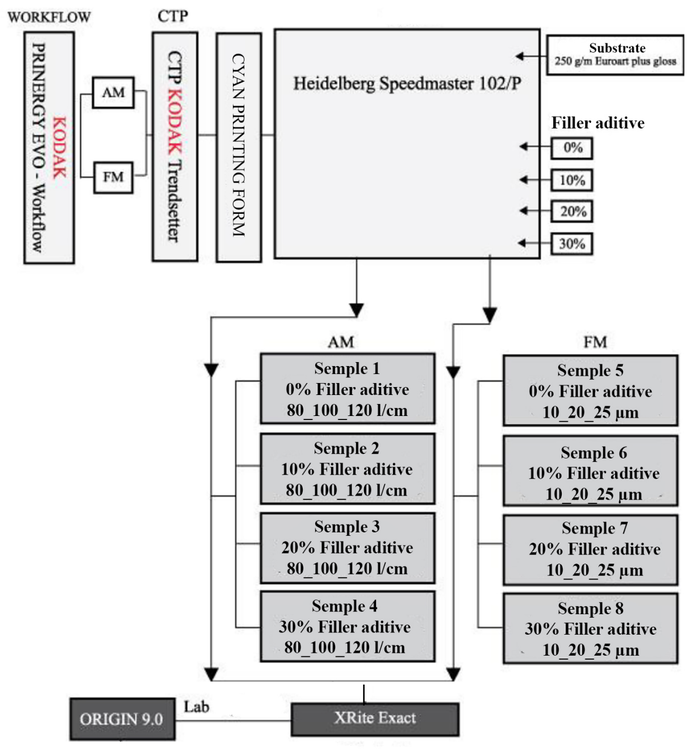

Figure 1

Schematic representation of the performed experiment

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http://image.made-in china.com/2f0j00EvWtTkyzJJqa/Pigment-Blue-2-.jpg)

[7] http://www.dyes-pigments.com/phthalocyanine pigments.html)

Discussion / Conclusion

With the FM screening, the addition of a filler in cyan ink will result in color changes in which the brightness coordinate increases and the prints become brighter. By reducing the size of the screening dots, the brightness decreases, and the color differences become lower.

By using the AM screenings and adding different concentrations of ink filler, more stable cyan prints are achieved. The color difference is less pronounced than prints with the FM screenings. This will result in that cyan prints that are closer to the PSO reference values. By applying a larger line screening (120 AM screenings) color deviation of cyan tones are larger and is not recommended for the realization of cyan tones.

Although the addition of fillers changes the rheological properties of ink (reduces the stickiness and possible tearing of the printing substrate), the optimal amount of filler additives should not exceed 10%. A higher percentage of ink fillers lose the target solid tone reference value and thus the contrast of the prints.

These tests and results make more sense in security printing where more expensive printing inks (pigments) are used. Therefore, the following tests will be performed on printing inks that have a response outside the visible color spectrum (UV and IR range).