

Colour Management in Digital Printing

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Abstract

Colour Management – Total Standardization

Colour management does seem to work with some careful thinking and a lot of groundwork. If the press crew is not taken into confidence it is sure to fail. The entire organization has a role to play and the whole exercise must be looked upon as a project over a period of time depending on the complexities of the digital press in question and then continuous monitoring.

Introduction

Colour management firstly need thorough standardization of the digital press and printing with various different substrates, toners or dyes, press settings, preventive maintenance, RIP settings, workflow, etc. used in a particular company.

A test form with standardized procedures has to be printed and evaluated. This test form is not only IT8/7.1-2 or IT8/7.3 or any such. In addition, must also print 'grey balance chart', UCR/GCR targets, sample pictures depicting many varieties encountered in production, and some additional control targets. Press printability calculation from these targets are necessary for programming an 'ICC profile' to get the meaningful results. Colour scanner settings are modified to improve on the not so good originals or where the customer needs changes from the original meant for reproduction.

In cases where digital print production has to match the conventional print processes, a similar exercise has to be carried out for these processes as well, ICC profile calculated and then applied for digital print production.

Test Form Elements

Full size print area 'flat tint' consisting of three or four colours (figure 1).

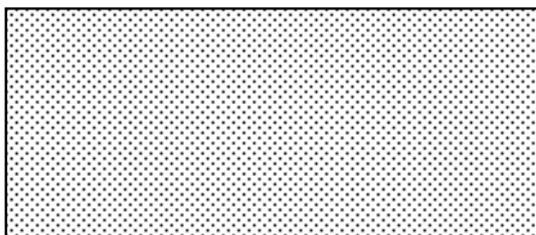


Figure 1. Full size flat tint

Independent CMYK colours and two colour combination vignettes in both directions of the print (figure 2). Letterings and lines in different weights normal as well as in reverse (figure 3).

Print control strips - On each side to check print variations (figure 4).



Figure 2. Vignette strip

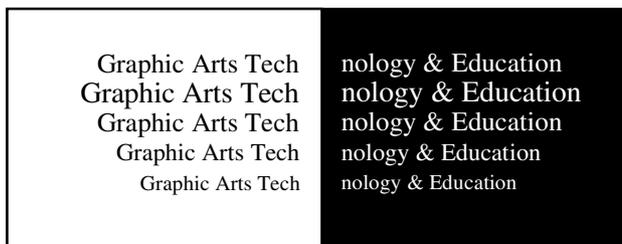


Figure 3. Normal and reverse letters



Figure 4. Print control strip



Figure 5. Grey balance blocks

Grey balance - Various combinations of cyan, magenta, yellow to find exact grey balance from light to dark tones (figure 5).

3 Colour tone curve - Calculated from grey patches (figure 5).

4 Colour tone and black colour curve - Calculated from UCR/GCR block (figure 6).

UCR/GCR - Various combinations of cyan, magenta, yellow, black to find exact amount of UCR/GCR possible or desirable (figure 6).

Total ink weight - Calculated from UCR/GCR block (figure 6).

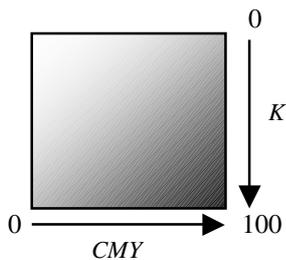


Figure 6. UCR/GCR

Colour scales - C, M, Y, K, C+M, C+Y, M+Y, C+M+Y, C+M+Y+K to find densities, Lab values, trap values and visual appearance of secondary and three & four-colour combinations (figure 7).

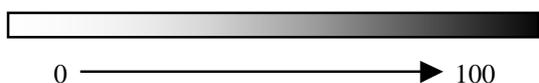


Figure 7. Colour scales

Quality control elements - Consist of resolution targets, register marks, etc.

IT8/7.1 and 7.2 charts - For colour scanner profiling.

IT8/7.3 or 6.02 or any such charts - For printer profiling.

Originals - Photographic prints, colour transparencies 35 mm and large format, artist drawings water colour, poster colour, oil colour, crayon, pencil, digital camera file, etc.

Depending on the print size of the digital printing machine all elements can be printed together or split into more than single test form.

Analysis

First thing is to make sure that the print is free of printing defects, such as too wide a density variation, doubling, slurring, ghosting, banding, etc.

Print control strip on each side of the test form enables to find out the density, dot gain, and trapping

variations across the width and length of the print area and set the latitude of the delta E value for each of the colour under production conditions. Prior to this the density values for each of the four inks, i. e. cyan, magenta, yellow and black are decided based individual colour contrast and two colour trapping, i. e. C+M, M+Y, C+Y.

Grey balance is visually decided under D 50 or D 65 or any other (according to users choice) viewing conditions and tone curve is plotted. From the UCR/GCR block the black starting point, end point, as well total ink weight is decided for a particular digital printing machine. The information thus derived is programmed in the ICC profile using colour management software so that the profile is created with the printability characteristics of a particular digital printer.

The colour management instrument and the related software must be calibrated and used as recommended. Similarly, the settings in the application software, RIP and the related workflow must be decided beforehand and carefully programmed.

References

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3. Prof. Dr. Stefan Brues, Liane May, Dietmar Fuchs, Postscriptum on Color Management, Second Edition, GretagMacbeth, Switzerland, February 2000.

Biography

Kiran Prayagi is a post-graduate in Colour Reproduction and Quality Control from the London College of Printing, England. Attended specialist courses in Europe. Professional membership of various associations. Experience in Print production with the printing companies and responsible positions with the multinationals like BASF, Crosfield Electronics, Linotype, etc. Affiliation to teaching institutes in India. Speaker at many conferences, seminars and workshops. A trade journalist. Working as industry consultant. Customers include many of the leading printing and print related companies in India and overseas.