

Test Targets Showcase: Digital Front-end Simulation

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Objectives

This is a study to illustrate Indigo UltraStream 2000's capability to produce a number of tone reproduction, and to use the IT8/7.3 target to simulate printing conditions with midtone dot gain of the Indigo.

Procedures

1. Dot gain references

In QuarkXPress 4.0, place the IT8.7/3 target and the pictorial target on a page, and output a file to the Indigo, then increase the amount of dot gain output by making an adjustment on RIP to vary dot gain on each printed sheet.

2. Measurement

Select printed sheets at 0%, 14%, and 25% dot gain, use the X-Rite Spectrodensitometer to measure each CMYK color patch on the target to obtain density values required by the Microsoft Excel 3a_PressSheet (v3.4).xls template.

3. Plate/Press curves

The 3a_PressSheet(v3.4).xls template calculates an amplitude response curve, which shows the relationship between percent dot area on the digital file and density value on the press sheet (See Figures 1, 2, 3).

4. Transfer curves

The simulation of dot gain done by RIP can also be achieved by applying transfer curves to the original pictorial image. The Microsoft Excel 5_Transfer-

(v2.4).xls template does this by calculating different values between the reference and the sample. By using density values from both sources, the template derives a set of density steps from 0% to 100% dot area, which can be applied as a transfer curve in Photoshop (See Figures 4, 5, 6, 7).

5. Applying transfer curves

In Photoshop 6.0, open the pictorial target and go to Page Setup > Adobe Photoshop > Transfer Functions to input transfer values of CMYK, then go to Layer > Split Channel to apply curves in each CMYK channel, finally merge all channels, place the target onto a Quark page, and output a file.

Discussion

By using transfer curves and a choice of paper, the Indigo can simulate tone reproduction of other output device in any given condition; e.g., coated stock with AM or FM screening. Also the Indigo can be used as a proofer for an offset press since the flexibility of its digital front-end enables the user to find out the best dot gain setting so that the Indigo can closely simulate the offset printing by quickly and effectively.

Print-RIT Test Forms used in this study:

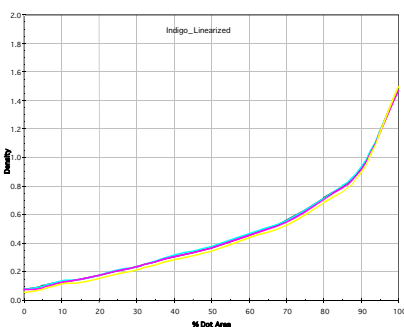
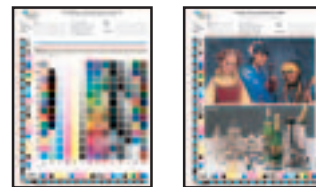


Figure 1. Amplitude response curves of the Indigo with DFE set at linearized mode.

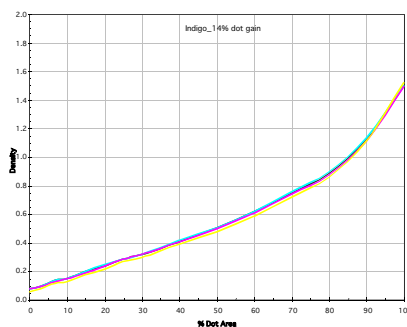


Figure 2. Amplitude response curves of the Indigo with DFE set at 14% dot gain.

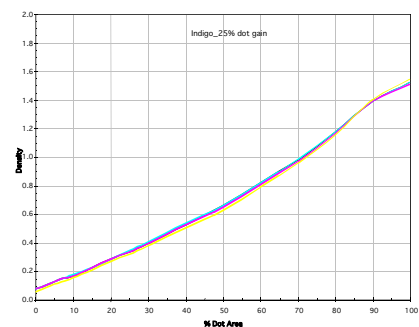


Figure 3. Amplitude response curves of the Indigo with DFE set at 25% dot gain.

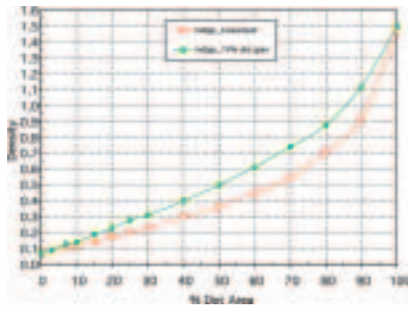


Figure 4. Amplitude response curves of the Indigo with DFE set at linearized and at 14% dot gain.

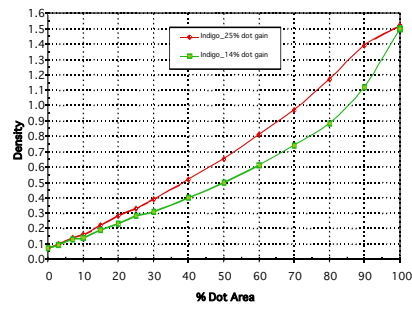


Figure 6. Amplitude response curves of the Indigo with DFE set at 25% dot gain and at 14% dot gain.

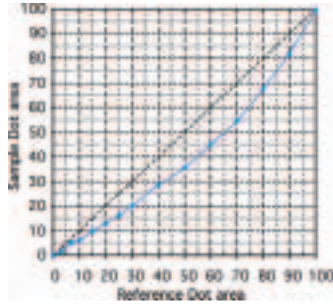


Figure 5. An example of the tonal transfer curve for the black printer to be applied to the 14% dot gain image.

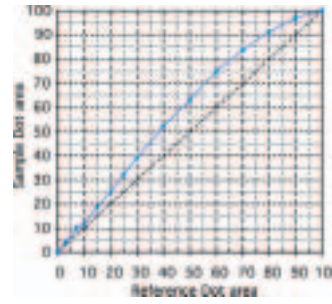


Figure 7. An example of the tonal transfer curve for the black printer to be applied to the 14% dot gain image.



Figure 8. The simulation done by using amplitude response curves to simulate tone reproduction of DFE set at linearized mode (A), 14% dot gain (B), and 25% dot gain (C).