

AM and FM screening

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Introduction

FM screening is becoming a trend in computer-to-plate workflow. The problem when using these fine screen rulings is that there is more dot gain. The solution is to apply transfer curves to the images, which compensates dot gain by reducing the frequency of microdot. It is understood that, to obtain good results, we must have a repeatable process which stays calibrated. For this experiment, different screening methods are compared. AM 150 lpi is used as reference and compared to AM 300 lpi, FM Staccato from Creo, and FM Velvet from Ugra. Both FM screens have a microdot size of 21 μ .

Procedures

1. Calibration, Measurement, and Calculation

The TF_04 Screening targets test form used was printed on the first calibration press run to SWOP standards. That test form has a series of step wedges for each screening, which were measured using an X-Rite densitometer. The data was collected and pasted into the "Transfer_Plot (v2.4)" Excel template that calculates a transfer curve from a reference to a sample (Figure 1).

2. Preparing the Images

The pictorial reference image used in this study, courtesy of Professor Patricia Russotti, contains fine detail, and it is a good resolution test. In order to be able to compare tone reproduction between the images, simple 4-color scales were added to the original image in Photoshop. To obtain different screenings on a single printing plate, screen rulings are embedded in the EPS images via PhotoShop. Transfer curves were implemented by altering the tone values in PhotoShop by using Image > Adjustments > Curves.

3. FM Screening

Velvet screening was implemented by first applying the needed curves to the Photoshop EPS file, which was saved without embedded screen ruling, and then processing this file using Velvet screening software set at 1200 dpi to create a bitmap

of 2x2 microdots. The default noise factor of 25 was used.

Staccato screening is part of the Creo RIP and is activated by embedding the screening called Staccato 20.

Screening	Embedded Screen Ruling	Applied Curves
AM	150 lpi	none
AM	300 lpi	yes
FM Velvet	none	yes
FM Staccato	Staccato 20	yes

Table 1. Settings for Images

Discussion

By analyzing the images in the next page we can observe that there is a difference between the images with and without transfer curves. Overall, it is quite easy to see that the images without curves are darker, due to dot gain. The transfer curves applied to the images on the right-hand column does not affect resolution, but it brings the images closer to the reference image (Figure 2).

A transfer curve lowers tone gradation to account for dot gain. The transfer curves from the different screenings are not much different from each other. However, the AM 300 lpi required more correction in the highlights than the FM to match the reference tone values.

AM 150 lpi screening is limited in showing as much fine detail as the others. For the fine screen rulings, the details are all there, and it does not matter if it is an image with or without transfer curves. The AM 300 lpi screen shows almost as much detail as the FM screens. However, the previous observation assumes that print to print registration is obtained. In Addition, the gray scale patches for Staccato appear more uniform than Velvet. Velvet might be improved by choosing a different noise factor.

In conclusion, the FM screening is capable of reproducing more detail, but speculations say that it can bring problems with paper dust piling, which is due to an ink emulsification for these extremely fine screen rulings.

Figure 1. Black transfer curves

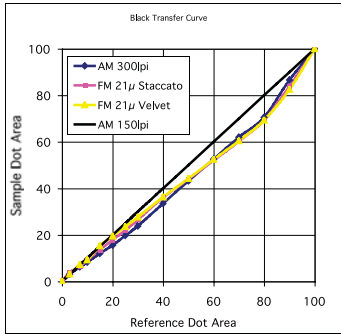


Figure 2. 150lpi AM - Reference image



Before (without curve)



After (with curve)

