

Print Analysis Procedure

The analysis procedures for a single sample sheet are contained in this guide. Suggested procedures for performing process variability studies are also included. To analyze a single sample sheet, the user needs a hand magnifier, a reflection densitometer, a color viewing booth, and a color proof or press OK sheet. The color proof or OK sheet serves as the standard for visual color comparisons with the sample being analyzed. The types of analyses performed on the sample can be divided into visual and instrumental categories. The visual analyses include assessment of slur, doubling, toning, mottle, image fit, highlight and shadow reproduction, and, most important, the extent to which the color reproductions match the color standard. Many print defects can also be identified visually, such as the presence of hickeys, missing spots in screen tint, broken lines, ink fill-in, wrinkles in the sheet, or wash marks. The instrument-assisted category of print analysis includes densitometric determination of ink density, dot gain, print contrast, ink trapping, hue error, and grayness. In addition, instrumental analysis of a sample sheet might include measurements of paper brightness, smoothness, gloss, color, or absorptivity.

All evaluations of color are made under standard lighting conditions as specified in ANSI PH 2.32-1972. Concise information about this standard is contained in GATF Technical Services Report No. 7233, *A Review of Color Viewing Conditions for the Graphic Arts*.

The procedure for analyzing a printed sample varies with the goals of the press testing. There is no rigid sequence for performing the analysis steps, but there are some conditions that must be satisfied before it is logical to proceed with the analysis. For example, if density aimpoints are not being met, an analysis of gray balance will only yield misleading information. A possible sequence for the analysis of a single printed sample follows:

1. Check the sample for wrinkles.
2. Examine the gripper marks at the lead edge of the sheet for evenness and pressure.
3. Scan the overall sheet for signs of toning, fill-in, or tinting.
4. Examine register and fit of the printed images.
5. Scan the sheet for defects such as picking, hickeys, or dissolved coating debris.
6. Measure the solid densities across the test form.
7. Measure the dot gain in several locations.
8. Measure the print contrast.
9. Measure the ink trapping for blue, green, and red.
10. Evaluate the ladder targets.
11. Examine the star targets to evaluate slur and doubling.
12. Examine the Dot Gain Scale-II® targets to estimate mechanical dot gain.

When sample sheets are taken, they should first be scanned in the viewing booth for gross print defects. Wrinkles, setoff, background toning, hickeys, and white spots in printed areas are identified, among other defects. An evaluation is made of the external register of the form to the sheet. Are the margins even? Is the form square to the sheet? An evaluation of image fit is also made. Are the images in good register? Are any colors protruding outside of the common windows?

After this initial look at the sample, a more thorough evaluation based on the quality control targets is undertaken. In practice, the use of the densitometer to measure print attributes, and the succession of visual evaluations made of the sample do not follow an absolute order. In this user's guide, the targets designed for visual evaluation are presented first, followed by a description of the targets designed for instrument measurement.