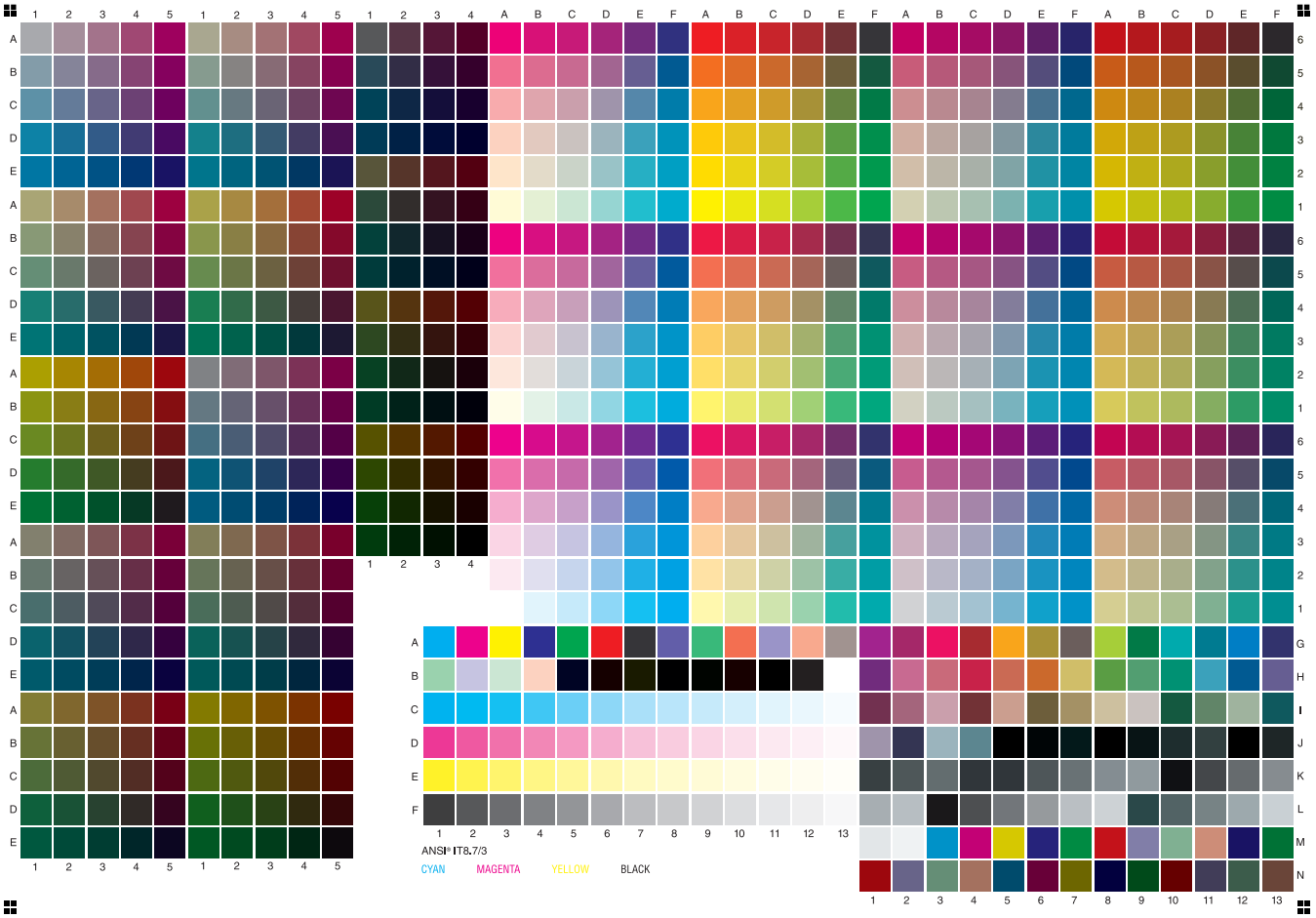
IT8.7/3

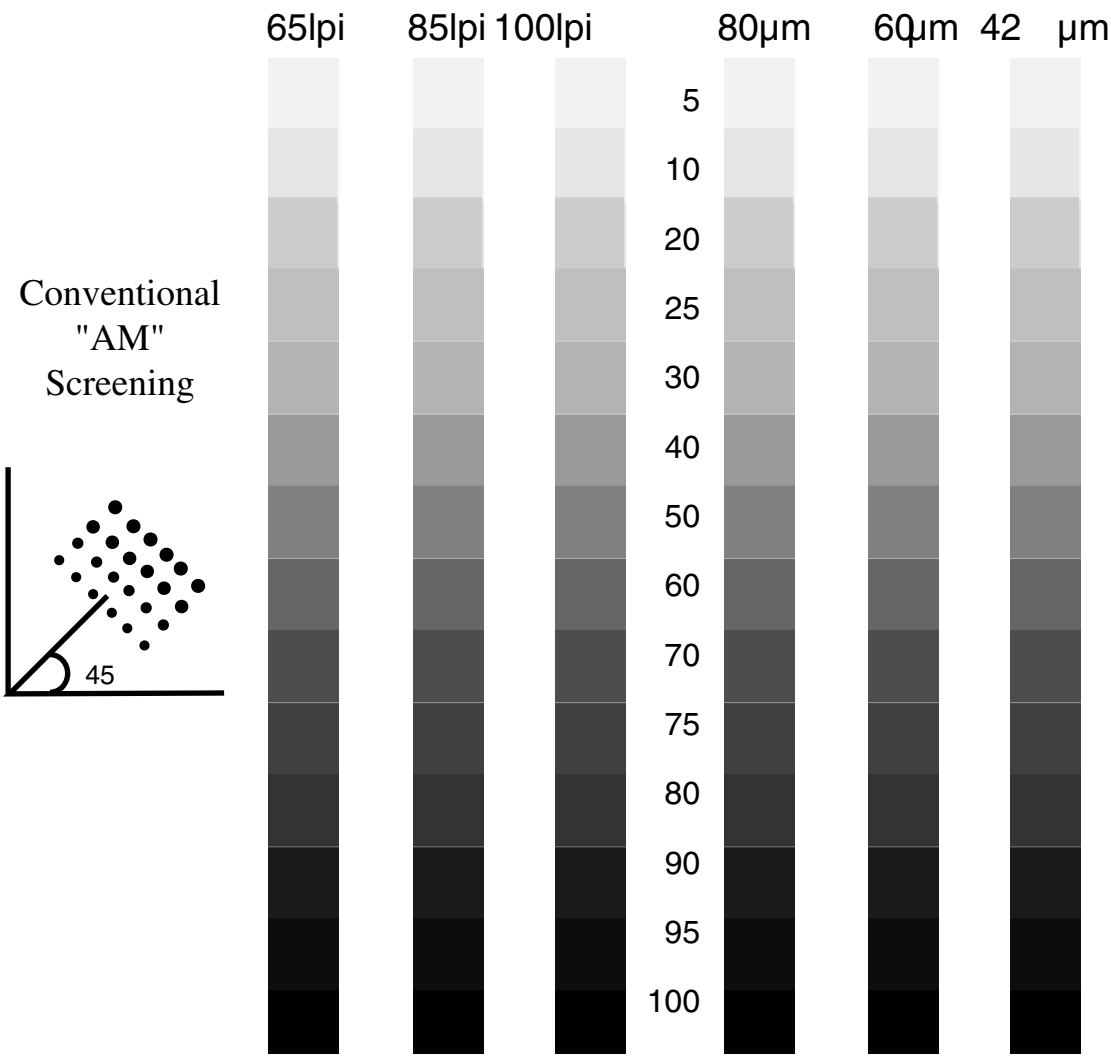


ANSI (American National Standards Institute), a U.S. member of the International Standards Organizations (ISO) that develops voluntary standards for business and industry. IT8 is a set of standards developed by the ANSI committee governing color communications and control specifications (Romano). IT8 standards cover RGB, CMYK, scanning targets, and multivendor calibration (Romano).

An IT8.7/3 target is a printed reflection target that can be used to obtain the color gamut achievable by the fingerprint test. The target can be read by either a colorimeter or by a spectrophotometer. Many devices exist today that will even automate the process of reading and interpreting the target generating a color profile of the achievable color gamut for each fingerprint test.These color profiles are governed by the ICC (International Color Consortium). They can be attached to color halftone files thus optimizing the color balance of the printed halftone itself for a particular fingerprint. Color profiles have helped to attain consistency within the printing process by permitting predictable color reproductions. *It is very important to understand that a separate profile is created from each fingerprint. Failure to utilize the appropriate profile, may result in unpredictable print.* If used correctly, ICC color profiles can be a powerful tool aiding all types of printers.

1. Romano, Richard & Frank: *The GATF Encylopedia of Graphic Communications,*GATF*Press*, 1998: p. 30.

Tone Scales



Tonal Range is defined as the range of halftone dots that can be printed. More specifically, it represents the highlight to shadow range that can be printed as determined by the fingerprint test. The tonal gradation information gained from the fingerprint test will ultimately influence the initial scanning stage of the reproduction and all subsequent halftone images. These tone scales can be read using a reflection densitometer that evaluates the dot area percentage as a percentage of the solid which is in question.

Conventional (AM) screen ruling breaks an image into different sized dots at a fixed angle with centers equally spaced. These dots are measured in the number of dots per inch (dpi) or lines per inch (lpi). AM screening is currently the most often used, and requires the least amount of computing power when outputting to film.

Stochastic (FM) screening breaks an image into the same sized spots in a random distribution. These spots are measured in microns (µm). Stochastic screening has helped eliminate moire and control abrupt tone breaks in graduated screen tints or vignettes.

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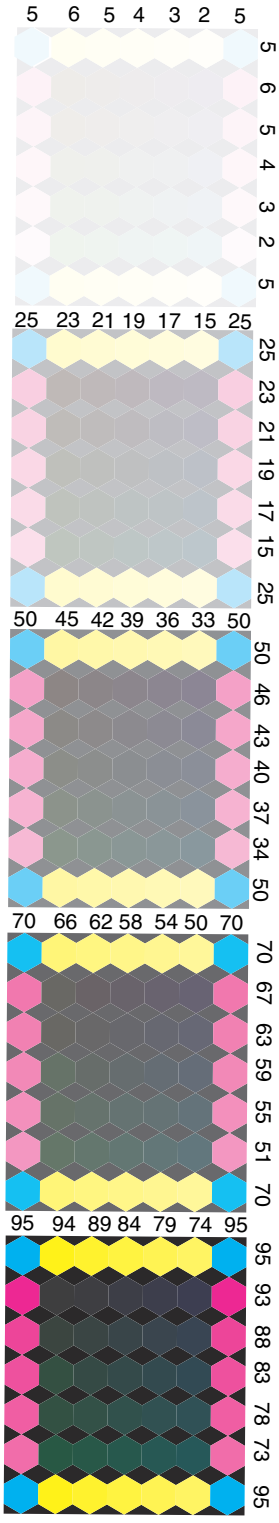
85 lpi

Gray Balance

80 µm

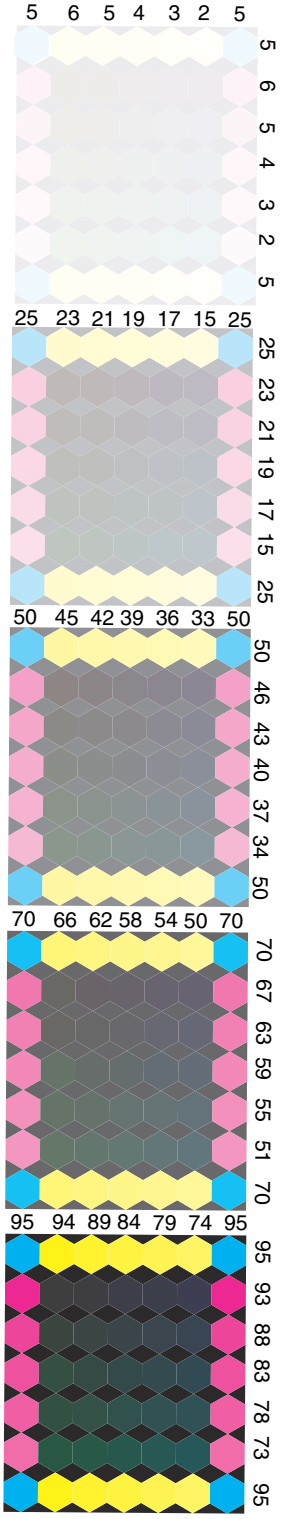


Gray is a color lacking a hue (also called achromatic color), or possessing all the wavelengths of light in equal amounts so that none predominates. (Romano, 1998). Grays are produced by the mixture of pigments. The substractive colors, *cyan*, *magenta*, and *yellow* (CMY) combine to produce a neutral gray.

Gray balance is the proper percentage of combinations of cyan, magenta, and yellow inks that produce neutral shades of gray. Hue (color) shifts will occur when there is any imbalance of one of the components. It is necessary that every printer determine their gray balance for each combination of these components at specific line rulings. This is obtained by using gray balance targets as shown left and right. The targets represent only five different dot percentages, a chosen highlight (HL), quarter tone, midtone, three quarter tone, and shadow dot (SH). *Note: More than five gray balance blocks can be used for a fingerprint.* The actual number of blocks used depends upon how much information is needed about different neutral gray dot percentages.

Using a densitometer, a neutral gray patch for each dot percentage can be recorded. This information is then used by the prepress department to set neutral gray control points for each halftone image. Knowing the neutral gray control points will ensure more consistent gray balance in printed reproductions.

The gray balance will vary for each different ink set as well as the same ink set over time. Therefore, it is recommended that the prepress department develop an upper and lower control limit around the average gray balance information. This will be the range the pressman must fall within while printing. It is further recommended that gray balance tests be repeated over time with the same ink set if it has not been used for an extended period of time.



1. Romano, Richard & Frank: *The GATF Encylopedia of Graphic Communications,* GATF*Press*, 1998: p. 368-9.

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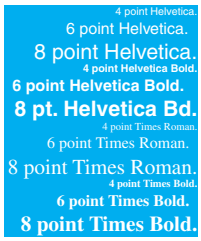
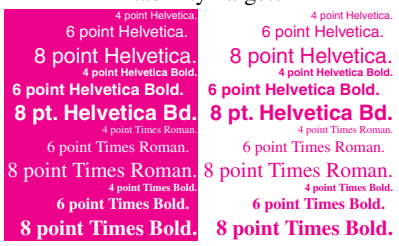
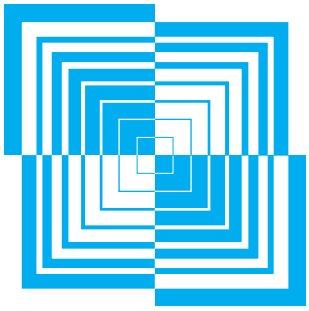
Control Targets

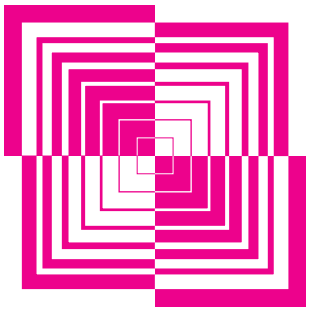


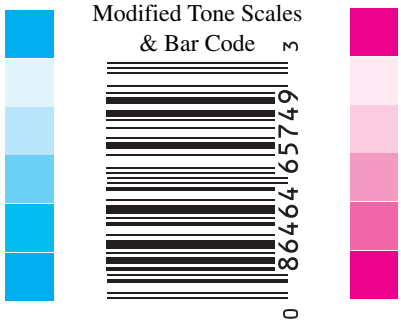
Printablility Targets





Resolution Targets
(Line Thickness Targets)





Control targets can be any target that is designed to provide information about specific printing characteristics. Usually, these targets are developed according to the type of printing process and press being used.

Printablility Targets

Both positive and reverse point size targets for type are used to control the minimum size of type printable by the fingerprint test.

Resolution Targets

Targets used for determination of achievable line thicknesses. The prepress department will use the information from these targets to determine the absolute minimum line, both positive and reverse, that can be achieved when printing.

Modified Tone Scales

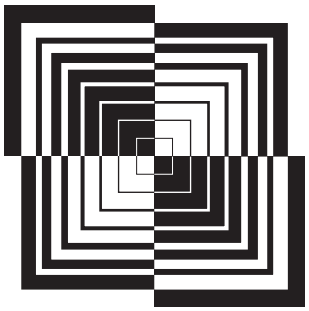
Other control targets consist of modified tone scales. These are used when there is limited space on the printed sheet. These control points can be used by the press operator to quickly monitor solid ink densities (SIDs) and dot gain (bottom corners). The press operator can then adjust the press according to the indicated condition of the printed sheet. It is a good idea to include tone scales with different screen rulings for a comparison.

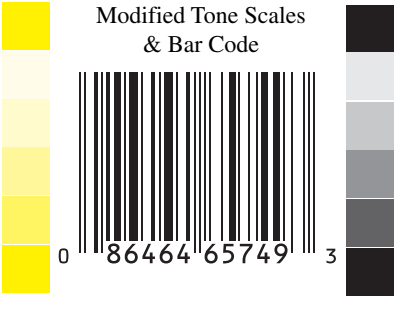
Bar Codes

Bar codes have a preset value and are used for pass/fail evaluation of bar code printing. They also relay information about distortion and impression.

Printablility Targets

Resolution Targets
(Line Thickness Targets)





Impression & Register

Slur & Impression

The press operator only wants the minimum necessary pressure to transfer ink from a printing plate to a substrate. The minimum impression or "kiss" impression between anilox-to-plate and plate-to-substrate is critical to successful flexographic printing. Slur is a blurred printed image, caused by impression settings and sometimes mechanical problems of the press. It is a printed defect characterized by the smearing of the trailing edges of a printed image or by the appearance of a double image. This can be caused by slippage of the substrate through the press which is caused by improper support of the sheet or other impression problems associated with anilox-to-plate or plate-to-substrate contact.

Too much impression between anilox-to-plate will result in a halftone dot that is hollow in the middle, like a doughnut. Too much plate-to-substrate impression will result in a dot that is solid in the middle with a soft vignette around the edge, resembling a halo.

Registration

Registration is defined as the alignment of successive colors and/or images as witnessed by register marks. The three uses of registration marks are to identify (1) position/location of the image on the substrate, (2) color-to-color registration,and (3) whether the image is square to the lead edge of the substrate. Proper register is necessary for an image in order to prevent unwanted colors and misalignments. The RTT© (Railroad Track Target©) type register mark helps solve register problems quickly by showing exactly the amount of misregister as a quantifiable movement. As a result, this can be easily corrected on press.

Trapping

"Wet Ink" trapping targets as shown provide information on how each color traps or sticks to the other when printed. Such information is useful when learning about the characteristics of the ink being used. They are also used to set impression of each color of ink. The prepress depatment can also read the color patches with a spectro-photometer to plot spectral curves for each of the colors; cyan, magenta,yellow and red, green, blue.

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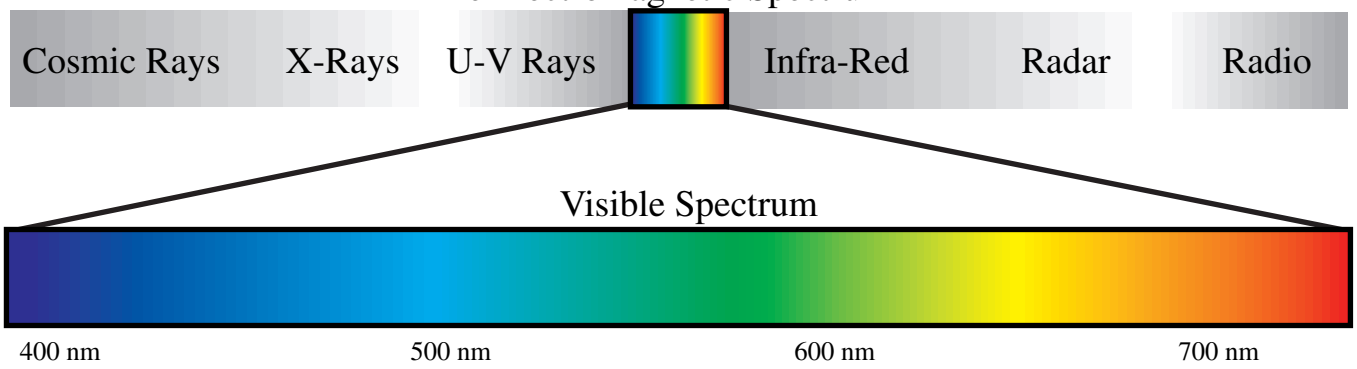
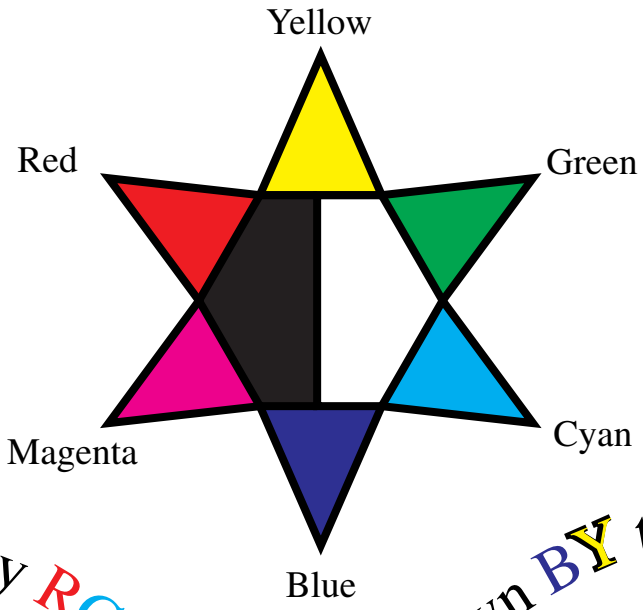
Color

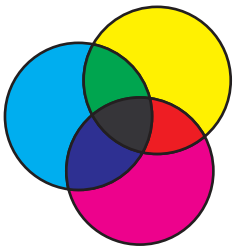
The Electromagnetic Spectrum



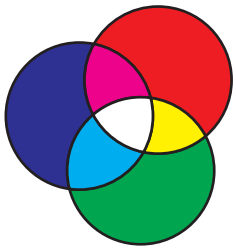


"I drink my RC in my GM down BY the river!"

Dr. Sam Ingram



Subtractive Color Theory
(printing inks)



Additive Color Theory
(TVs & monitors)