

Color Bars/ Densitometer/ PMS Guide

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Color Bars



Color bars are also referred to as *color control bars*, *color control strips*, or *proofing bars*. Color bars are rows of different colored patches printed in the trim area of the press sheet. They are used by proofers and press operators to control the **trapping**, ink density, **dot gain**, and print contrast of the proof or the printed sheet. They usually consist of solid and tint blocks of cyan, magenta, yellow, and black; two and three color solids and tints; and additional elements and patterns such as resolution targets and dot gain scales.



Solid process colors of Black, Yellow, Cyan, and Magenta. A color bar are used to measure ink densities.



Solid overprint colors include blue (C&M), green (C&Y), and red (M&Y)



Screen tint patches usually 25%, 50%, and 75% of the process colors. A color bar are used to check for dot gain.



A color patch made up of 50C/30M/30Y. A color cast in the patches will show an imbalance in one of the colors, either from incorrect ink density or from dot gain.

There are several different types of color bars and which one to use depends on the type of printing being used. Prepress and print suppliers purchase original film or the rights to digital files of color bars and other test images. The film and files can then serve as constant reference points throughout the **proofing**, **platemaking**, and **print** processes. They are available from GATF (Graphic Arts Technical Foundation), DuPont, RIT (Rochester Institute of Technology), and others.

Color bars are an essential troubleshooting tool. They are easy to analyze, both visually and with a **densitometer**, which is an instrument used for measuring the relative density of any part of an image.

Color bars created for computer-to-plate (CTP) systems may require additional features than color bars generated for film.

Densitometer

Density is the level of darkness in a negative or positive film or print. The measurement of density is called densitometry. An instrument called a densitometer is used to measure the density. The density of a photographic positive or negative is a result of the amount of silver dye developed in the film or photographic paper. In printed copy, density is caused by the light-stopping ability of the pigments in the printing ink that are deposited on the paper by the printing process. Densitometers are widely used in the graphics industry to help control color in each step of the printing process.

There are three types of densitometers:

- Transmission - A transmission densitometer measures the amount of light transmitted through a transparent material. It determines the opacity for different areas of an original transparency or of the processed film negative or positive.
- Reflection - A reflection densitometer measures the amount of light being reflected from a surface, such as a reflection original. The reflection readings are also used to calculate total dot gain, hue error, grayness, and other characteristics in printed pieces.
- Combination - A densitometer that measures both reflection and transmission densities.

Density and opacity are the same thing but they are measured differently. Density is measured with readings that run on a scale from 0 to 4.0, with the highest number having the greatest density. Opacity is measured in decimal numbers ranging from 1 to 100. The higher the number, the greater the opacity.

Densitometer readings are different for different types of substrates. For example, for optimum print reproduction on newsprint, the recommended densitometer reading is 1.4 to 1.8 for a black and white print and 2.5 to 2.8 for a color transparency.

To measure color, a test strip across the edge of the proof or press sheet is used. The test strips are called **color bars**, print control strips, color control bars, color control strips, or proofing bars. The different strips are available commercially from several vendors. The usual targets on a test strip are the solid ink density, dot area/gain of the quarter, half, and three-quarter tints, contrast, and the trapping of ink overprints.

Note: Always let the densitometer warm up after it is switched on and then calibrate it to the manufacturer's specifications before use.

PMS Guide

The Pantone Matching System® is the industry standard for selecting, matching, and mixing color. The Pantone System utilizes 11 basic colors to achieve over 1000 different colors that are used by printers and art departments. The basic colors that are used are yellow, warm red, rubine red, rhodamine red, purple, violet, reflex blue, process blue, green, black, and transparent white, which looks clear.

The Pantone Matching System® Color Guide is an indispensable tool for printers and designers. The guide provides swatches for all of the colors that can be attained using the Pantone System. Included in the guide are the 11 basic colors which are in the front of the book, followed by the process colors used in 4 color process printing, then the hundreds of colors that can be mixed from the basics, and finally the fluorescent and metallic colors. Each of the mixed colors are assigned a PMS number. The first number assigned for a mixed color is 100 and the numbering proceeds up from that point. The instructions for mixing the color are listed below the color swatch. The mixing instructions show the number of parts for each of the basic colors that are necessary to mix a particular color, as well as a percentage of the total volume for each of the colors that are required. For example, to achieve the color Pantone 198 (which is a red color), the mixing instructions are listed as follows: 6 parts (37.5%) Rubine Red, 2 parts (12.5%) Yellow, and 8 parts (50%) Transparent White. By using the various ink formulas found in the swatch book, ink manufacturers and printers can mix colors to exact specifications. Pantone also issues a digital color guide for electronic publishing which lists the color formulas in a format necessary for the colors to be displayed on a computer screen.



Note: *Any Pantone Color Guide should be replaced after a year, because the printed colors in the swatch book will shift or fade and no longer be a true representation of the actual colors.*
