

PANTONE®-calibrated printers



PANTONE® certified vs. PANTONE® calibrated

The PANTONE® Company offers “The PANTONE® Certified Printer Program” in which certification experts audit, inspect, analyse and qualify a printer to ensure the highest level of accurate colour reproduction. A comprehensive print test evaluates the accuracy of reproducing spot and process colour printing, TVI (dot gain) curves, grey balance, photo half-tones, and overall print colour and clarity. The certification must be renewed through an annual audit. Only printers with the PANTONE® seal of approval are officially certified (for example, digital or analog ink presses).

HP printers are PANTONE®-calibrated. When a printer is PANTONE®-calibrated, the printer manufacturer has engaged PANTONE® to develop specially optimised colour data so that the customer can get the best possible representation for the PANTONE® Solid Color standard on coated stock. The specific driver/RIP, device settings, ink set, colour engine and paper stock used are considered in developing the colour data since all these factors can affect colour output.

PANTONE® background

PANTONE® started as a company that produces inks for the commercial printing industry. In 1963, Lawrence Herbert saved PANTONE® from bankruptcy with the creation of an innovative system of identifying, matching, and creating colours. This solved the problems associated with producing accurate colour matches in the graphic arts community. The PANTONE® system starts with 14 inks known as the “PANTONE® Basic Colors” (2 yellows, orange, 4 reds, purple, violet, 3 blues, a green and a black). Herbert’s unsupported assumption that the spectrum of colour is seen differently by each individual led to his dramatic innovation of the PANTONE MATCHING SYSTEM®, a “book” of standardised colours in fan-format. By standardising the colours, different manufacturers in different locations were able to refer to the PANTONE® system to make sure colours match without direct contact with one another. Each colour was printed on coated and uncoated stock and was accompanied by the precise ink formula for accurate reproduction on press.

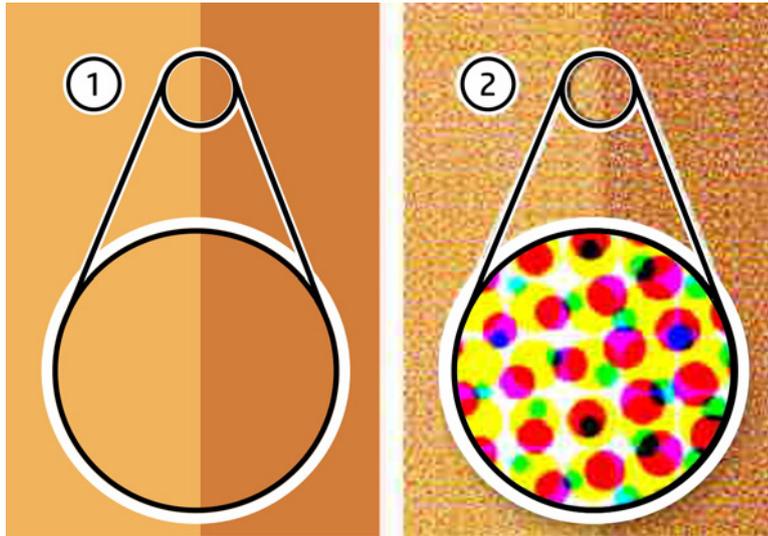
The current edition of the PANTONE MATCHING SYSTEM® has 1,085 such colours often referred to as “Solid Colors” since they are made by mixing inks and adding them to a solid colour station rather than by half-toning the process like CMYK inks. The CMYK process is a method of printing colour by using four inks—cyan, magenta, yellow, and black. With CMYK printing, halftoning (also called screening) allows for less than full saturation of the primary colours; tiny dots of each primary colour are printed in a pattern small enough that human beings perceive a solid colour. Magenta printed with a 20% halftone, for example, produces a pink colour, because the eye perceives the tiny magenta dots on the large white paper as lighter, and less saturated, than the colour of pure magenta ink.

Without halftoning, the three primary process colours could be printed only as solid blocks of colour, and therefore could produce only seven colours: the three primaries themselves, plus three secondary colours produced by layering two of the primaries: cyan and yellow produce green, cyan and magenta produce a purplish blue, yellow and magenta produce red (these subtractive secondary colours correspond roughly to the additive primary colours) plus layering all three of them resulting in black. With halftoning, a full continuous range of colours can be produced.

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August 2014

Figure 1: PANTONE® solid colours and CMYK half-toned colours



The PANTONE MATCHING SYSTEM® is widely used by the printing industry to specify the colour of objects. By using PANTONE®-calibrated colours and palettes, you can achieve the closest colour match possible when a file is printed on HP Color LaserJet printers.

For PS and PCL printing, application-specific palettes are available and can be used to colour the objects in a document with the best PANTONE® colour simulation for the HP printer. In addition, the HP printer RGB (red-green-blue) and CMYK values for each PANTONE® colour are available by printing an .eps, .tif, or .ps file, or by finding the value in a text lookup table.

HP printers are PANTONE® calibrated

Printing PANTONE® colours on an HP CMYK four-colour laser printer is always a simulation of PANTONE® Solid Colors. HP PANTONE® simulations provide a representation of a portion of the true PANTONE® Solid Colors.

HP partners with PANTONE® to create the PANTONE® colour tables for our printers. These colour tables are a “best effort” simulation of the PANTONE® Solid Color guide. The PANTONE® tables in HP Color LaserJet printers are developed to simulate the PANTONE® Solid Colors, not the process colour patches. A large number of the PANTONE® Solid Colors (approximately 60%) are outside the colour range (gamut) of our CMYK colour laser printers. This means that we have the ability to accurately print approximately 40% of the 942 colours in the PANTONE® Process Color Imaging Guide. The colours that are reproducible generally fall in or close to the neutral axis of the printer’s colour gamut. The remaining 60% of these out-of-gamut colours fall well outside the gamut of our Color LaserJet printers and will be represented by colours that do not match the intended PANTONE® Solid Colors.

The job of a colour scientist is to re-map these out-of-gamut colours to best represent the PANTONE® Solid Colors. One method is to re-map to the closest colour that the printer is capable of producing. Although this is the simplest method, it would render a large number of simulated PANTONE® colour swatches to be printed as the same colour. In an attempt to create a series of colour variations to give each simulated colour patch a slightly different colour, the colour scientist creates a series of colours that progress in steps to the most saturated colour the printer can produce. This technique provides a colour change between patches, but it may not be identical to the PANTONE® Solid Color seen in the PANTONE® Process Color Imaging Guide. This system of PANTONE® matching produces a placeholder colour that may or may not be an exact match to the PANTONE® Solid Color.

Colour consistency

When printing PANTONE® colours on HP printers, the printed output may not match the PANTONE® Process Color Imaging Guide Solid Colors. This is not a sign of a damaged or malfunctioning printer. HP Color LaserJet printers are not designed to be PANTONE® proofing devices and have a limited capability to produce the full range of PANTONE® colours.

Using PANTONE®-calibrated tables and palettes

The printer-specific PANTONE® palettes are available on hp.com on the printer support site. Search under product support for your specific printer to access application-specific palettes, as well as a specific name-to-printer CMYK colour tables for your printer. Also available are .tif (Tifchart) and .eps (EPSchart) files that can be printed to create colour charts of the PANTONE® calibrated printer colours.

You must select the correct palette and colour chart based on the print driver that you are using. The CMYK palettes can only be used with the PS driver. The CMYK palettes are optimised for the default setting (Default CMYK Inkset) of the printer. The RGB palettes work best with the PCL (5 or 6) driver. The RGB palettes are optimised for the sRGB default “Color Setting” to “Automatic.” They can be used in many applications with the PS driver, but will produce unpredictable results with some software that does not send RGB data through PS.

Any colour management software, such as ICM or ColorSync, must be turned off when printing PANTONE® colours specified as CMYK or sRGB values. These colour conversions will change the colours sent to the printer and reduce the accuracy of the PANTONE® colour simulation.

Loading custom PANTONE® palettes in applications

Each palette is specifically designed for the application/printer combination. Load the printer PANTONE® palette for your application, as explained in the PANTONE® User Guide document, located with the palettes and tables on the HP website. Because each palette is unique, the palette must be loaded into the application that you are using to create documents with HP-calibrated PANTONE® colours. Supported applications include: Adobe® InDesign, Illustrator, Macromedia Freehand, PageMaker, and Photoshop®; CorelDraw; and QuarkXPress.

Colour printing variables

PANTONE® colours generated by the HP Color LaserJet are four-colour process simulations and cannot match PANTONE®-identified Solid Color standards. Use current PANTONE® colour reference manuals for accurate colour.

There are many variables in the four-colour process reproduction of colours generated by the HP Color LaserJet, any of which can affect the quality of the PANTONE® colour simulation, including:

- Type of paper used
- Type of toner used
- CMYK Inkset setting
- Colour settings
- Environmental conditions
- Overhead lighting
- Personal differences in perception of colour
- Software applications
- Printer drivers

For optimum results, we recommend that the following be used:

- Paper: HP LaserJet paper
- Toner: HP Color LaserJet print cartridges
- CMYK Inkset: Default
- Colour options: Automatic

Depend on HP innovation and reliability

HP works very closely with PANTONE® to ensure our laser printers and MFPs are PANTONE®-calibrated and match the PANTONE® colours as closely as possible. In addition to our efforts with PANTONE®, HP Color LaserJet devices employ built-in proprietary image enhancement technologies that render vibrant and sharp colour prints, particularly with HP ColorSphere toner, which is independently formulated to work optimally with each engine design. Automatic print quality enhancements include HP EasyColor, HP ImageREt, adaptive half toning, trapping, environmental sensing, and intelligent automatic colour calibration. The results are consistently realistic images with smooth and uniform colours, crisp detail, sharp edges and text, excellent tone scale, and fine line art. According to Buyers Laboratory LLC, HP “color

production remained consistent from the first page to the last.”¹ This consistency is essential for your business to create marketing tools in-house. Printing colour in-house can save you up to 50% in printing costs, according to InfoTrends.²

HP innovative devices consistently deliver prints with:

- **Sharp edges.** Adaptive half-toning and trapping provide sharper overprints and better edge quality on coloured text and line art. HP automatic enhancements deliver bold, legible lines, while our excellent colour plane registration and trapping algorithm leave clean black lines on coloured backgrounds. When it comes to coloured text, HP technology produces sharp, evenly shaded text without jagged edges or a halo around edges.
- **Uniform colours and smooth gradients.** HP half-toning algorithms provide consistent and vibrant colours without the graininess seen in many competitors' prints, while providing smooth transitions along gradients.
- **Realistic images.** HP ImageREt technology provides smooth colours and excellent tone scale with realistic depth.

Common acronyms and definitions

CMYK: Cyan, magenta, yellow, and black (CMYK) are the ink colours commonly used in printing. The process is often called “four-colour printing.” CMYK data files are typically used by and originate from graphic arts (printing and publishing) environments.

HP PPE: HP Professional PANTONE® Emulation is a technology that enables graphical elements in designs to have PANTONE® colour names assigned to them. The HP printer substitutes these PANTONE® colour names with RGB or CMYK values determined specifically for that printer and media at the time of printing.

PCL: Printer Control Language is a language (command codes) that enables applications to control some HP printers.

PS: Postscript is a programming language that describes the appearance of a printed page. All major printer manufacturers make printers that contain or can be loaded with Postscript software, which also runs on all major operating system platforms. A Postscript file can be identified by its “.ps” suffix. Postscript describes the text and graphic elements on a page to a black-and-white or colour printer or other output device.

sRGB: Standard red-green-blue is a world-wide colour standard originally developed by HP and Microsoft® as a common colour language for monitors, input devices (scanners and digital cameras), and output devices (printers and plotters). It is the default colour space used for HP products, Microsoft operating systems, the World Wide Web, and most office software sold today.

For more information

For a list of PANTONE®-calibrated printers, visit: pantone.com/pages/calibratedprinters

¹ Source: “BLI Winter 2013 Pick Award, Hewlett-Packard Company, Outstanding Color Printer/MFP Line of the Year.” Copyright 2013 Buyers Laboratory LLC. For more information visit buyerslab.com.

² Based on InfoTrends Cost of Print Studies, April 2010.

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