

The image features a vibrant, multi-colored halftone pattern. The pattern consists of small dots in various colors (red, blue, green, yellow, black) arranged in a grid. A prominent white horizontal band runs across the center of the image, serving as a background for the text.

COLOR!



Monday, October 31, 11



Color Management

A system of:
hardware, software & procedures
that are calibrated to best insure
color accuracy and repeatability
throughout the production process



Terms

Color

Hue

Value

Density

RGB

CMYK

Gamut

Spot color

Flood

Pantone

Duotone

Hexachrome

Toyo/Trumatch

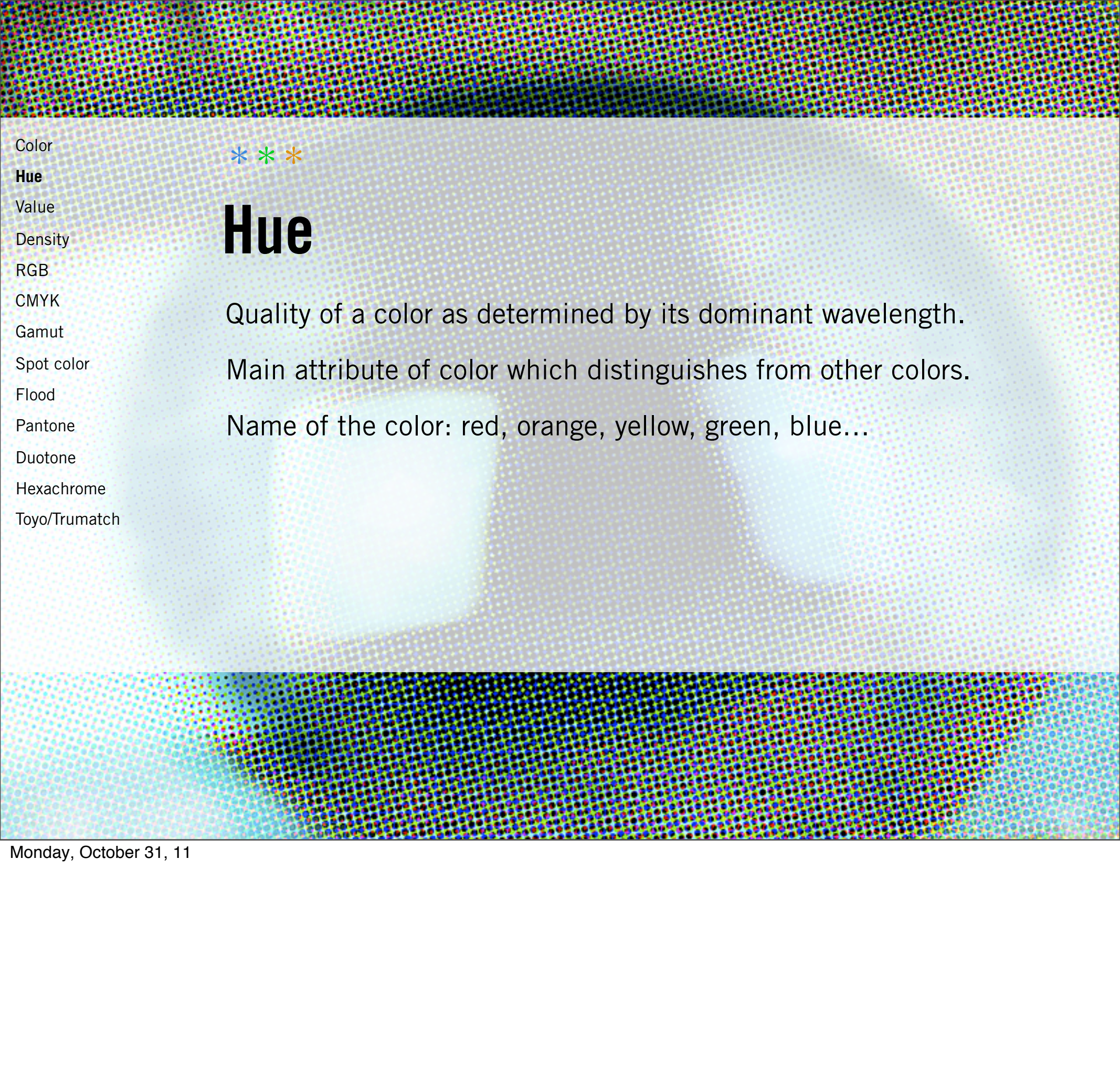
- Color
- Hue
- Value
- Density
- RGB
- CMYK
- Gamut
- Spot color
- Flood
- Pantone
- Duotone
- Hexachrome
- Toyo/Trumatch



Color

Sensation caused by light as it interacts with the eye.

Also used for the property of objects that gives rise to these sensations.



Color



Hue

Value

Hue

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Quality of a color as determined by its dominant wavelength.

Main attribute of color which distinguishes from other colors.

Name of the color: red, orange, yellow, green, blue...

Color

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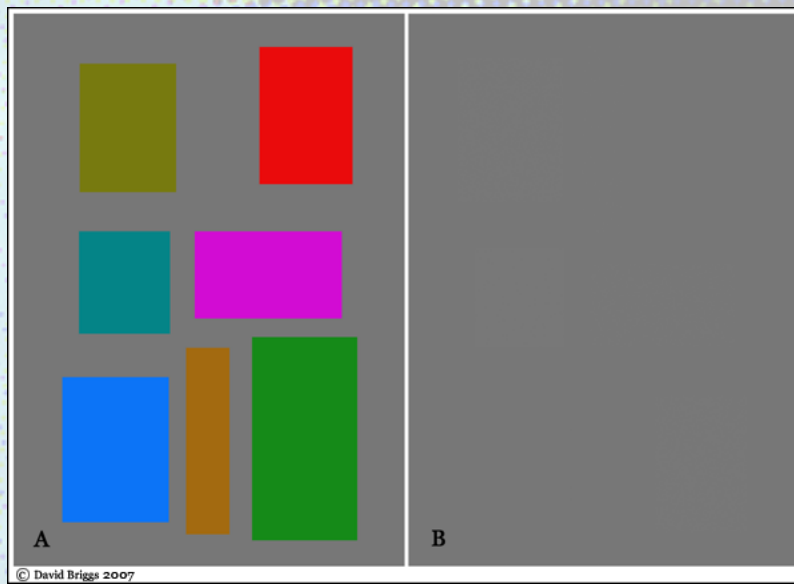
Hexachrome

Toyo/Trumatch



Value

The relative lightness or darkness of a sample of color.



Helmholtz–Kohlrausch Effect. A: Various colours on a grey background, all measuring L = 50 in Photoshop. B: same image converted to greyscale mode.

Color



Hue

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Density

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Ability of an object to stop or absorb light.
The less the light is reflected, the higher its density.

Ink Density: measure of the amount of ink on a substrate, like paper. Measured mechanically in today's press room.

Color



Hue

Value

RGB

Density

RGB

Additive Primary Colors

CMYK

Gamut

Spot color

The colors most closely associated with the human vision spectrum and used in screen technologies.

Flood

Pantone

Duotone

Red, green, and blue light are combined in various ways to create other colors.

Hexachrome

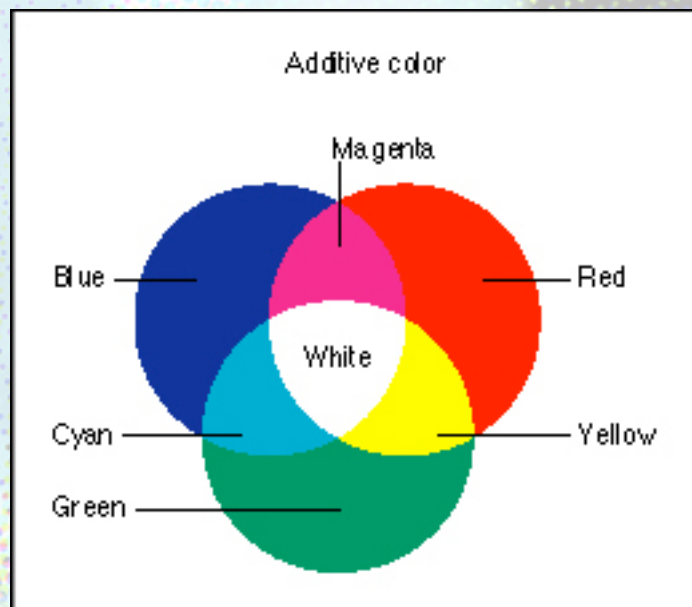
Toyo/Trumatch

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RGB

Theory: pure red and green light produce yellow, red and blue make magenta, blue and green combine to make cyan, and all three together, when mixed at full intensity, create white.



Color



Hue

Value

CMYK

Density

RGB

CMYK

CMY: Subtractive Secondary Colors

Gamut

Spot color

Secondary colors of light, the result of a mix of two primaries.

Flood

Pantone

For mixing of pigments, it is better to use the secondary colors, since they mix subtractively instead of additively.

Duotone

Hexachrome

Toyo/Trumatch

The colors that are seen are from the part of light that is not absorbed. (Taking away the light that is reflected back to your eye, thus subtractive.)

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CMYK: Process Printing

When a secondary process color (CMYK) is laid on white paper, some wavelengths reaching it are absorbed and others are transmitted to the paper surface.

The white surface reflects the wavelength (color) reaching it back again through the ink filter and it reaches the eye.

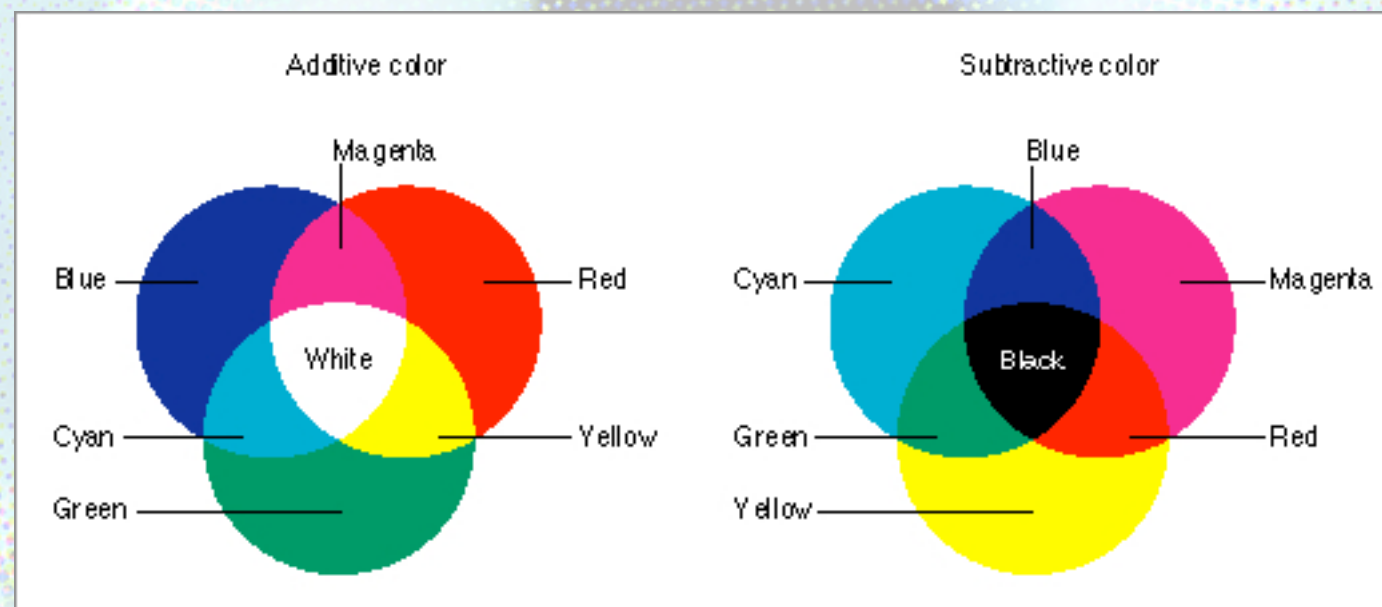




CMYK: Process Printing

Cyan, Magenta and Yellow printed together on white result to black in theory. In actuality, it prints a muddy grey.

Needs black to darken colors and provide shadow.



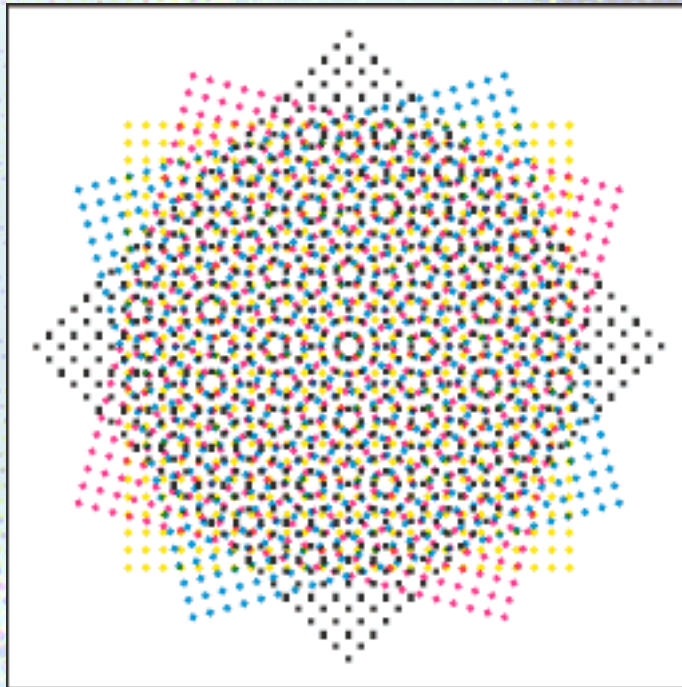
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CMYK: Process Printing

Four color process printing: technique of printing that uses black, magenta, cyan and yellow to simulate full color images.



In most cases, the color is inked onto the page in tiny dots.

In most offset printing these dots are arranged in a **rosette pattern**.

The eye blends four color dots into one color on the page.

Color



Hue

Value

Density

RGB

CMYK

Gamut

Spot color

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CMYK: Process Printing

Gamut limitations of process printing:

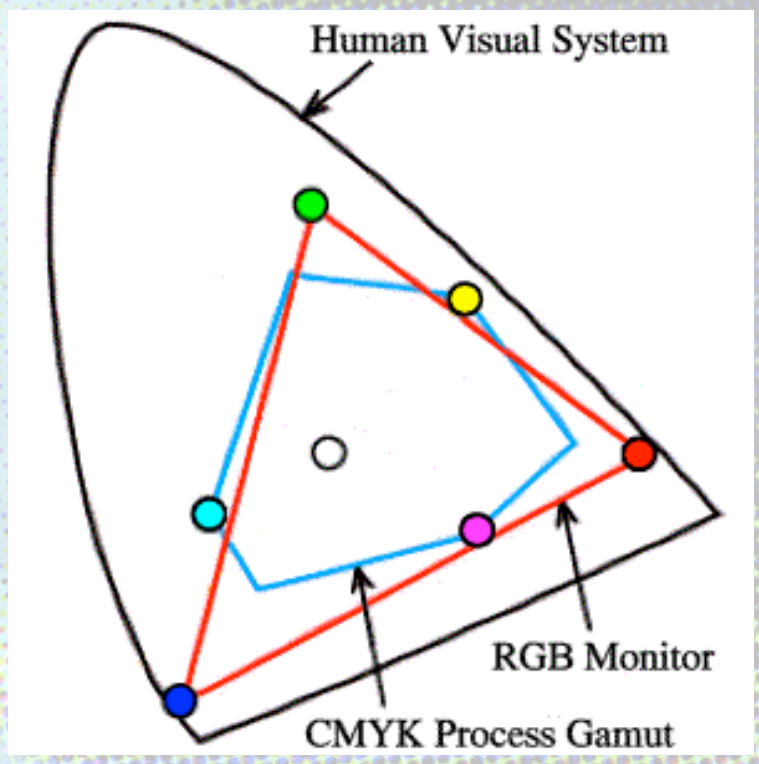
- > Does not produce clear colors in the orange range
- > Greens and true purples are difficult to reproduce

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Gamut

Color gamuts represent the universe of colors that can be created or displayed by a given color system or technology.



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Gamut

In Photoshop, if you select a CMYK color that is not in the printable gamut, a warning will appear.

Select foreground color:

Color Picker

OK

Cancel

Custom

H: 32 ° L: 69

S: 100 % a: 40

B: 99 % b: 75

R: 252 C: 0 %

G: 136 M: 56 %

B: 0 Y: 100 %

FC8800 K: 0 %

Only Web Colors

Color



Hue

Value

Density

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CMYK

Gamut

Spot color

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Spot Color

Instead of four color process printing with CMYK inks, **one ink** can also be applied to a sheet that is a **pre-mixed color** with specific control systems to assure the color will remain consistent.

When one ink or varnish is applied to a portion of a sheet of paper or other substrate, it is called a **spot color**.

The ink is applied to the paper in dots, and variations in the dot proximity create varying tints.

Color



Hue

Value

Density

RGB

CMYK

Gamut

Spot color

Flood

Pantone

Duotone

Hexachrome

Toyo/Trumatch

Flood

To print a sheet of paper or other substrate completely with an ink or varnish is called a **flood** or “painting the sheet.”

Color



Hue

Value

Density

RGB

CMYK

Gamut

Spot color

Flood

Pantone

Duotone

Hexachrome

Toyo/Trumatch

Pantone Matching System

A proprietary system that precisely characterizes a color by numbers, so that a color can be matched, universally.

Ink companies have a formula that they use to mix inks to match preprinted swatches manufactured by Pantone.



Color
Hue
Value
Density
RGB
CMYK
Gamut
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Flood
Pantone
Duotone
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Toyo/Trumatch



PMS

Factors to remember that affect the color when matched to a swatch:

- > paper color
- > paper texture
- > ink density

Color



Hue

Value

PMS

Density

RGB

CMYK

Gamut

Spot color

Flood

Pantone

Duotone

Hexachrome

Toyo/Trumatch

History of Pantone

- > Began in 1962 by Lawrence Herbert
- > 1968 The first PANTONE Four-Color Process Guide
- > 1968 The PANTONE Color Tint Selector
- > 1987 there were 747 colors
- > 1991 there were over 1000
- > new GoeSystem has 2,058

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PMS

Color forecasts:

Each season Pantone publishes a guide to forecast colors.

Influenced by the fashion industry, palettes are emotive.

	
PANTONE 12-0642 Aurora	PANTONE 16-6339 Vibrant Green
	
PANTONE 17-1462 Flame	PANTONE 15-1331 Coral Reef
	
PANTONE 17-1022 Kelp	PANTONE 19-4039 Delft
	
PANTONE 15-2215 Begonia Pink	PANTONE 16-3931 Sweet Lavender
	
PANTONE 15-5217 Blue Turquoise	PANTONE 16-5804 Slate Gray

Color



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PMS

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Toyo/Trumatch

Has grown to offer many different colors and ink controls, color calibration systems and software.

PANTONE GUIDES:

Traditional printing

Digital environments

Textiles for fashion & home

Industrial design

Architecture and interiors

Plastics

Color



Hue

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Gamut

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Pantone

Duotone

Hexachrome

Toyo/Trumatch

PMS

PANTONE GUIDES FOR PRINTING INK:

Solids : one color of ink

Tints : indicates how tint values of one color will print

Foils : metal color foils

Process : Pantone recommended CMYK colors

Solid to Process : conversion between solid color & CMYK
(matches about 50% of the colors, but watch oranges, bright greens and purples)

Color



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PMS

When Spec'ing PMS Process Colors:

Allow for some variation Unfortunately, process colors do not always come out the way they are supposed to.

Specify your colors and hold the printer to a match on a color check in order to get the results you want.

Some variation is acceptable, but not much.

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PMS

PANTONE SOLID INKS:

Coated (for coated papers)

Uncoated (for uncoated papers)

Metallic

Pastels

Pearlized

In addition to including it on your spec sheet, attach chips to your projects when they go to print to eliminate confusion

Color



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Pantone

Pantone books are pricey, but necessary.

Choosing color from your screen is risky, even with a calibrated monitor. The inks look completely different on paper.

Duotone

Hexachrome

Toyo/Trumatch

PMS books have a lifespan for replacement, color changes and fades.

Color



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Duotone

Two solids mixed together in an image. Often, the colors are one PMS solid and black.

Saves cost in printing and creates interesting effects.

You can also build tritones and quadtones.

Using the Pantone Duotone guide for predictable results is recommended. Duotones are difficult to proof on desktop printers. (Because the proofing devices often use a CMYK ink system)


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Duotone



Duotone Options


Type: **Duotone**

Ink 1:  **PANTONE Process Yellow CVU**

Ink 2:  **PANTONE Process Black CVC**

Ink 3:   _____

Ink 4:   _____

Overprint Colors... 

Preview



Color
Hue
Value
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Hexachrome

1995: PANTONE Hexachrome Color Selector.



Monday, October 31, 11

Hexachrome was a six-color printing process designed by Pantone Inc. In addition to custom CMYK inks, Hexachrome added orange and green inks to expand the color gamut, for better color reproduction. It was therefore also known as a CMYKOG process.

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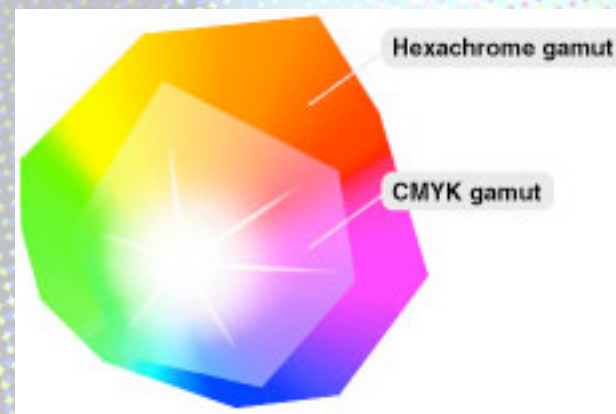
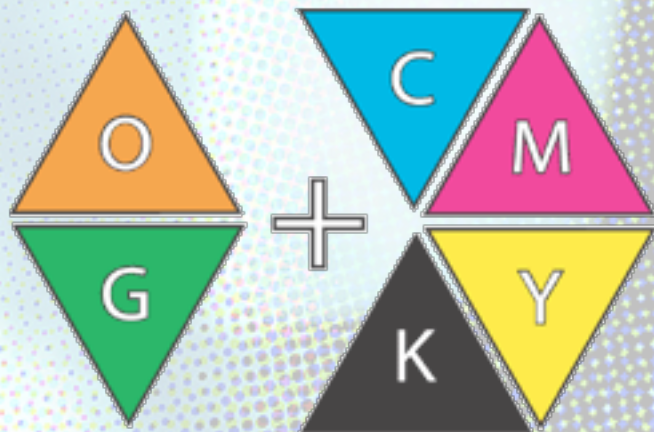
Toyo/Trumatch



Hexachrome

6 color process: CMYKOG (orange + green)

Reproduces 90% of the PMS instead of 50%. Extends the gamut into the RGB range in order to better reproduce what's on screen



Monday, October 31, 11

Hexachrome was discontinued by Pantone in 2008 when Adobe Systems stopped supporting their software. While the details of Hexachrome were not secret, use of Hexachrome was limited by trademark and patent to those obtaining a license from Pantone.

In order to use the Hexachrome process in a digital printing process, Pantone produced a plugin for Adobe Photoshop that allowed the designer to work in an RGB color space more typical of computer work.

The plugin was discontinued by Pantone in 2008 because Adobe Systems no longer supported Pantone's Rosetta (legacy) plug-in format.



Other Systems

TOYO COLOR FINDER

Founded: September 10, 1896

Items Handled: Printing inks, newspaper inks, UV cure inks, gravure inks, graphic arts materials & equipments, metal decorating finishes, resins, adhesives, waxes, laminating adhesives, coating & painting materials, pigments, pigments, dyestuffs, water based colors, chips, plastic colorants, media materials, computer softwares, etc.



Other Systems

DIC COLOR

DAINIPPON INK AND CHEMICALS, INC

Japanese

<http://www.dic.co.jp/>

TRUMATCH

<http://www.trumatch.com/welcome.htm>



WYSIWYG ? Not so much.

With color, what you see is not what you get unless you calibrate. Technologies are available to calibrate, or you can have someone come in and adjust your system for you.

For print, it is important to use print color control systems like PMS to assure predictable on-press results.

Ink on paper is always different from color on the screen.

* * *

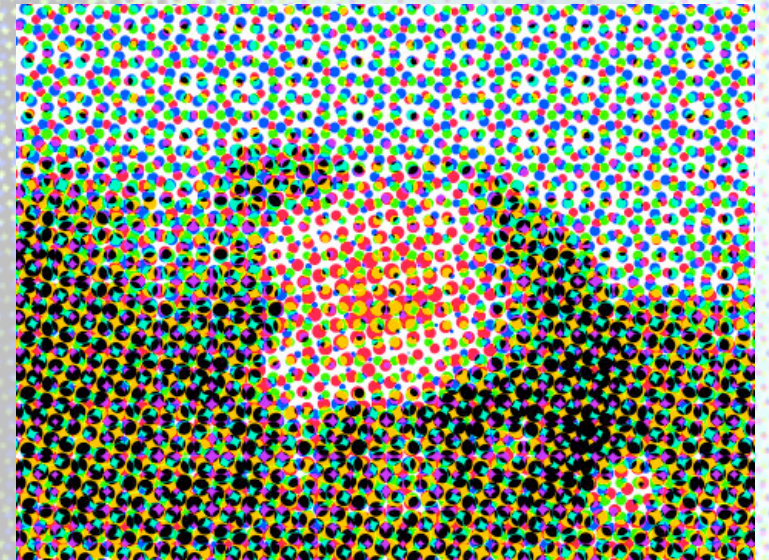
Summary

Ink is usually printed onto paper in dots. Those dots are each one color.

The color that we see reflected back is either a combination of the dots (as in CMYK or in a Duotone)

OR is the result of dots of all one specific color, not a combination (spot inks).

This is the core difference between 1, 2, 4 or 6 color printing.

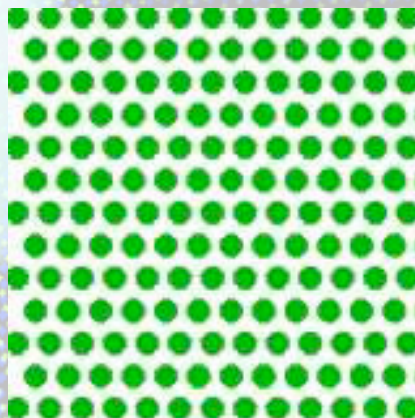
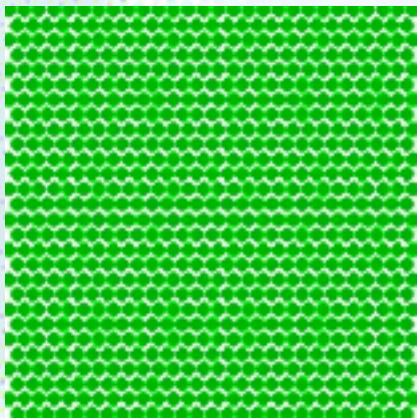


* * *

Summary

Other major factors in the way we see the color reflected back:

- > how far apart the dots of color are
- > the substrate they are printed on
- > the density of the ink



END



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