

"Color is life itself."

COLOR ISSUES

Glossary

additive color	red, green, blue (RGB)
subtractive color	cyan, magenta and yellow (CMY)
CMYK	cyan, magenta, yellow, black (CMYK)
complementary colors	those opposite each other on the color wheel
hue	refers to a color's name
saturation (chroma)	represents the relative purity or intensity of a color
shades	created by adding black or complementary colors to a hue
tints	tints are created by adding white to a hue
tones	tones are created by adding gray to a hue
value (brightness)	describes how light or dark a color appears

Color Models

RGB = Red, Green, Blue = Additive Primaries

- transmitted light
- additive primaries are colors used in Lighting, Video, Film Recorders and Monitors

CMYK = Cyan, Magenta, Yellow, Black = Subtractive Primaries

- reflective light
- subtractive primaries or process colors are used as inks, toners or dyes in the printed world
- Cyan + Magenta + Yellow = Black (in theory, actually equals muddy brown due to impurities in printing inks)

Indexed Color=

A single-channel image, with 8 bits of color information per pixel.

The index is a color lookup table (CLUT) containing up to 256 colors out of a palette of 16.7 million possible colors.

Hue, Saturation, Brightness

Hue	(color itself)	Example: green or brown	Adjective example: greenish or reddish brown
Saturation	(purity of color)	Example: pale or rich	Adjective example: grayish or vivid
Brightness	(value of color)	Example: dark or light	Adjective example: dim or dazzling

Three Ways Viewing Colors

The human visible spectrum

Example = what your eyes can see

Largest range or color gamut

A subset of the visible spectrum

Example = a photographic transparency or a RGB computer monitor

A subset of the visible spectrum

Example = CMYK printed document, such as a magazine cover

Smallest range or color gamut

Gamut literally means the total range of possibilities.

Pixel Value

The value of a pixel is based on the number of bits of information the pixel contains.

The number of bits of information also is known as bit resolution or pixel color resolution.

24-bit = 2^{24} = 16.7 million colors = true color

8-bit = 2^8 = 256 colors

4-bit = 2^4 = 16 colors

1-bit = 2^1 = 2 colors

Input Devices

Reflective art scanner

- for scanning reflective art like photographs or drawings.

Slide scanner

- for scanning photographic slides or transparencies.

Video Input

- for capturing images from live video, video disks or video cassettes. A video frame grabber is a circuit board that translates the image into a format the computer can accept.

Digital camera

- digital cameras (also called still video cameras) use a CCD chip to capture and store the image to a floppy disk.

Color Proofing & Proofs

Soft Proof

- monitor

Digital Proofs

- dye sublimation Example: Digital Continuous Tone Color Printer
- inkjet Example: Iris Ink Jet
- Approval System Example: proofing system by Kodak. Only proofing system to show actual four color process printing dots without need to output to film

Off-Press Proofs (from separation negatives)

- Chromalin by DuPont
- MatchPrint by 3M
- Color Keys
- Agfa Proof

Press Proofs

- made on the printing press. Very expensive to set up the press just to run a proof.

Color Printing Situations for Offset Lithography

Four Color Process

- uses cyan, magenta, yellow, & black (CMYK) ink to make all colors.
- color separations include one separation for each color

Spot Color

- a pre-mixed color of ink.
- color separations include one separation for each spot color to be printed.

Hi-fi Color

- seven color printing increases the color space or gamut.
- adds orange, green and violet to CMYK

Ink Color Systems for Offset Lithography

Pantone Matching System

- organizes color by page number and position on page, with colors getting "darker and dirtier" as position number increases
- not designed with "four color process" color in mind, although some colors have CMYK simulations
- color charts are displayed in chromatic order
- current market position for solid ink color separation

Trumatch

- colors numbered by basic hue, with two subsets of numbers for lighter and darker versions
- fanbook of colors arranged according to spectrum