

Professional Publishing

Colour theory

References

“The Non-Designers Scan and Print Book”

– Chapter 9 Process colour printing

“The Non-Designers Design Book” 3rd edition

– Chapter 7 Using Colour

“The Complete Guide to Colour”, Tom Fraser
and Adam Banks

Colour display and printing technologies

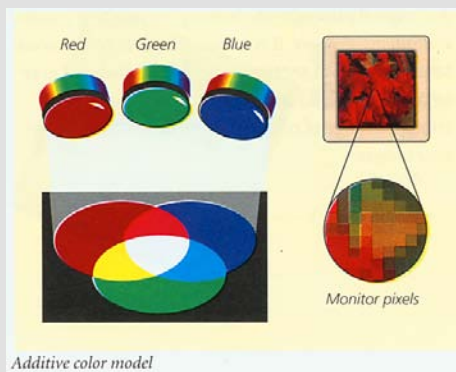
Photographic images consist of millions of subtle shades of colour

Different devices have different ways of reproducing colour ranges

Printers reproduce colours on a page using coloured and black inks

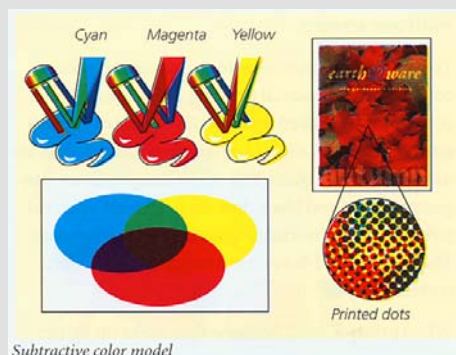
Computer screens reproduce colours on the screen using coloured light 'guns'

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The RGB 'Additive' Colour Model

The CMK Printing 'Subtractive' Colour Model



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What is a *Continuous Tone* image?

An image that displays continuous colour (or gray for a black and white photograph), at all viewing magnifications

An original photograph or slide (transparency)



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What is *halftone* screening?

A printing technique for reproducing continuous tone images onto the printed page

The image is broken down into a series of dots by the halftone screen

The dots control where and by how much the printing ink is applied to the paper

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More on *halftone* screening

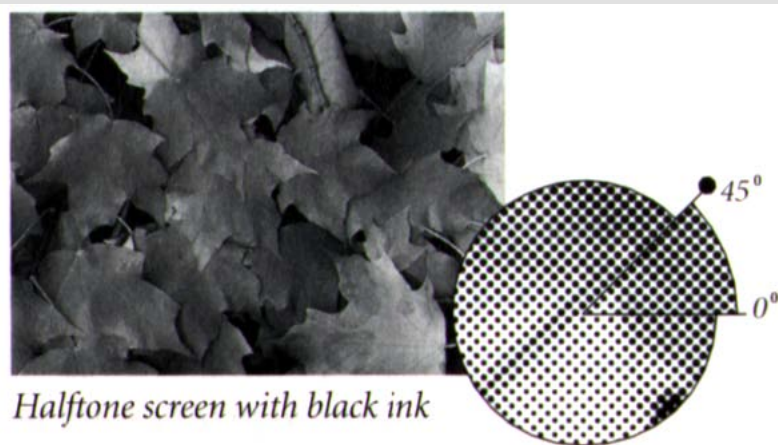
Varying the size and density of halftone dots creates the optical illusion of seamless colour, or gray, in the printed image

Screens are specified by their angle (e.g. a 45° screen) and their density (screen ruling or lines per inch)

Postscript laser printers use halftone screens for printing images

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Black and White halftone screen



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Comparison of low and high B/W halftone screen rulings



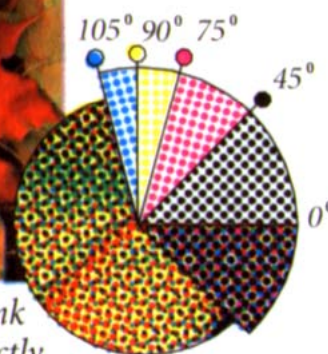
Low screen ruling: 50 lpi



High screen ruling: 175 lpi

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Colour halftone screen



Halftone screens with process ink at different screen angles; correctly registered dots form rosettes

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Comparison of low and high Colour halftone screen rulings



Low screen ruling: 100 lpi



High screen ruling: 175 lpi

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What is *CMYK*?

Coloured inks used for full colour images

- C (cyan) M (magenta) Y (yellow) K(key, usually black)
- Each colour is printed onto the printed page using an halftone screen

CMYK colours are specified in DTP programs

C,M and Y when mixed together form a muddy brown, therefore black ink is usually added to the printing process

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CMYK Printing Plates

Y(ellow)

C(yan)

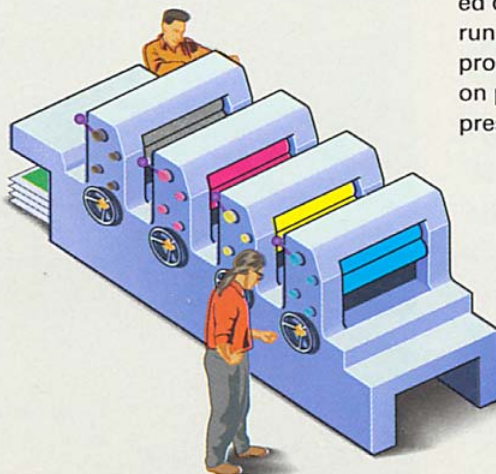


M(agenta)

**K(ey)
colour,
usually
Black**

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Four Colour printing

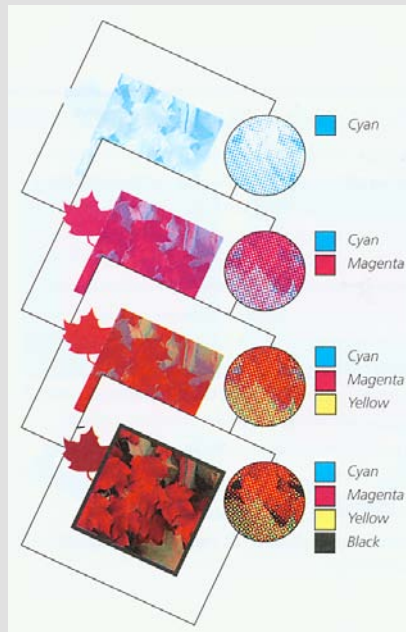


Printing

The plates, ink, and paper are mounted on a press and the job begins to run. The press operators refer to the proofs to adjust ink balance and color on press. The designer may also be present to approve the printed results.

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Overprinting
CMYK plates
to create a
full colour
image



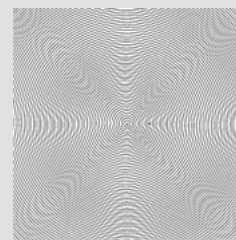
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Avoiding Moiré Patterns

Failure to Descreen will
produce a 'Moiré Pattern'
when you print the image

This is the technical term
for the 'clash' of halftone
screens

Can produce a banded
or dotted appearance



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An example of a Moiré pattern

This scan shows a common moiré pattern.



This scan shows the same scan with the moiré minimized.



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What is Figure - Ground?

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Figure 2.20 – Faces or a Candle?

A variation of the lovers can be seen here. Figure 2.20 can be seen as two faces or a lit candle. (From Kettlekamp, 1974).

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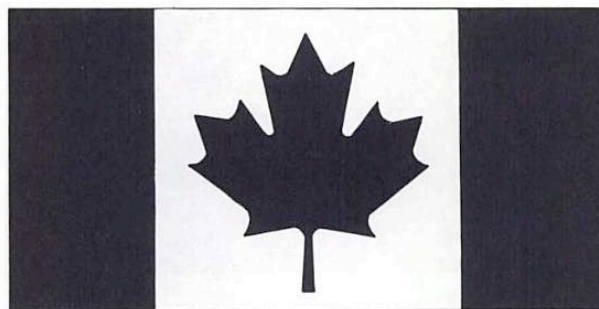


Figure 2.21 – The Canadian flag—two angry men?

A similar effect can be seen in the Canadian flag, but in this case the two faces are not lovers, but can be interpreted as two angry men. If you look at the upper left- and right-hand edges of the maple leaf, the leaf itself can be seen as separating two angry faces with long noses, and their foreheads pressed together much as in Figure 2.19. The faces can be seen just above an imaginary line between the extreme points on the leaf just above the base looking into the center. In Canada they are called Jack and Jacques. Perhaps they are arguing about the merits of English vs. French.

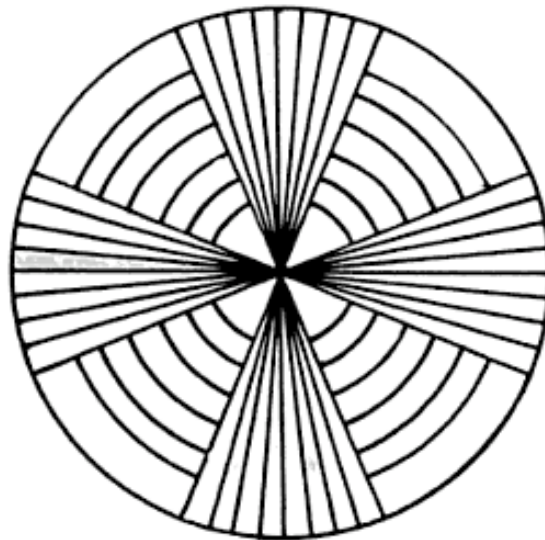
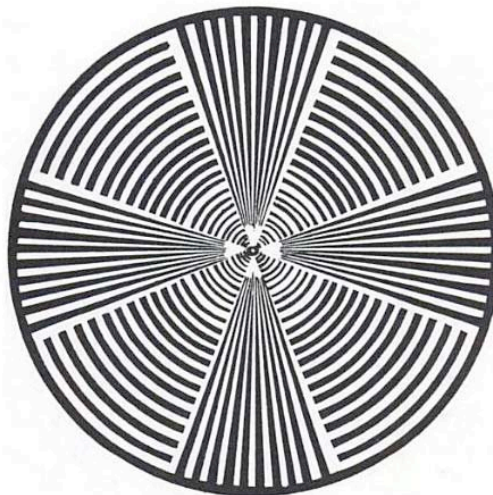


Figure 3.14 – Are the circular lines in front of or behind the radial lines?

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Figure 3.15 – Are the circular lines in front of or behind the radial lines?



When the amount of space taken up by the black lines becomes approximately equal to the white spaces, there is a strong sense of "visual vibration." (See chapter 19). In Figure 3.15 these very strong spokes and arcs seem more unstable, and it is difficult to focus steadily on one or the other.

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Useful websites

<http://creativecurio.com/2008/05/the-color-wheel-and-color-theory/>

<http://www.inspirationbit.com/dos-and-donts-colour/>

<http://www.markboulton.co.uk/journal/comments/five-simple-steps-to-designing-with-colour-part-3-colour-combinations>

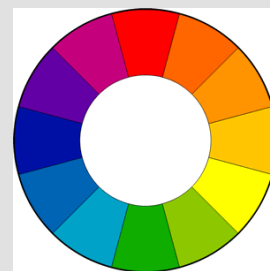
http://www.artskills.com/students_colors_as_feelings.php

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Colour Theory

The Colour Wheel

A color circle, based on red, yellow and blue, is traditional in the field of art.



Sir Isaac Newton developed the first circular diagram of colours in 1666.

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Primary Colours

Triangular position on the wheel

Paint = Yellow, Red, Blue

In color theory, these are the 3 pigment colours that can not be mixed or formed by any combination of other colours.

All other colours are derived from these 3 hues



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Secondary Colours

Green, orange and purple

Secondary colours are formed by mixing the Primary colors.



Secondaries



Primaries & Secondaries

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Tertiary Colours

Colours are formed by mixing a Primary and a Secondary color.

Hue therefore has a two word name.

Yellow-orange, red-orange, red-purple, blue-purple, blue-green and yellow-green.



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Primaries



Primaries & Secondaries

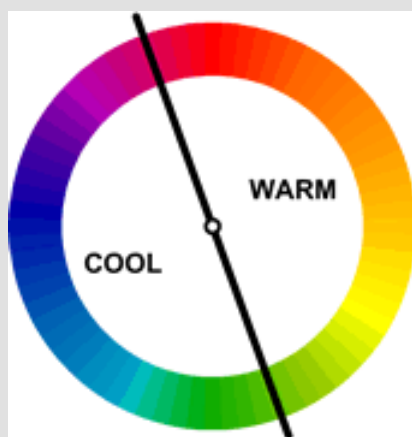


Secondaries



Tertiaries are inbetween

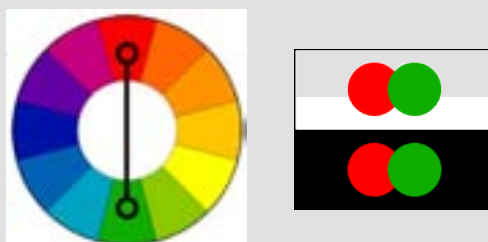
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Complementary Colour Schemes

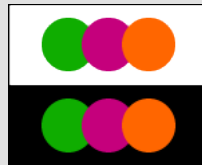
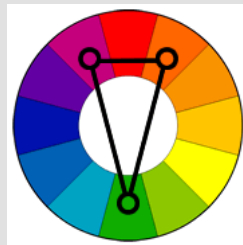
Colours that are opposite each other on the color wheel (example: red and green).



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Split-Complementary Colour Schemes

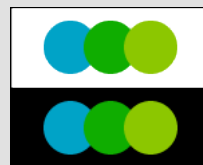
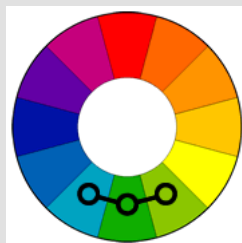
A variation of the complementary color scheme. The base color (green here) uses the two colors adjacent to its complement.



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Analogous Colour Schemes

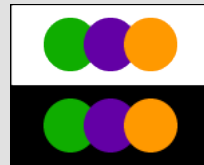
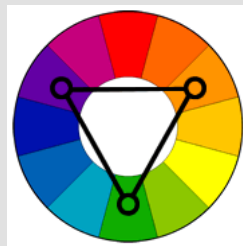
Colours that are next to each other on the colour wheel.



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Triadic Colour Schemes

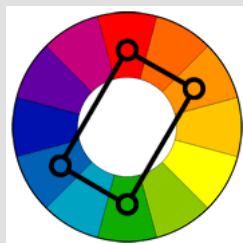
Colours that are evenly spaced around the color wheel.



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Rectangular (Tetradic) Colour Schemes

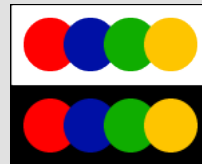
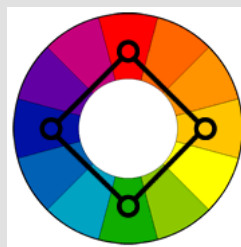
The rectangle or tetradic color scheme uses four colors arranged into two complementary pairs.



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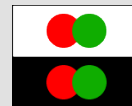
Square Colour Schemes

The square color scheme is similar to the rectangle, but with all four colors spaced evenly around the color circle.



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Complementary Colours



Split Complementary Colours



Analogous Colours



Triadic Colours



Rectangular (Tetradic) Colours

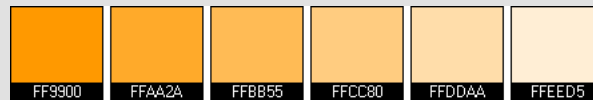


Square Colour Scheme

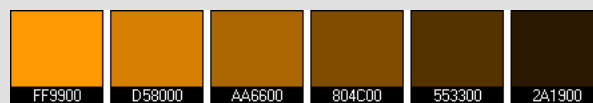


Tints, Shades & Tones

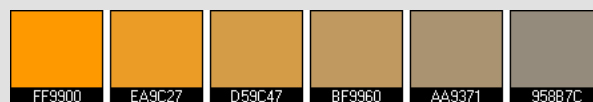
Tints - adding white to a pure hue



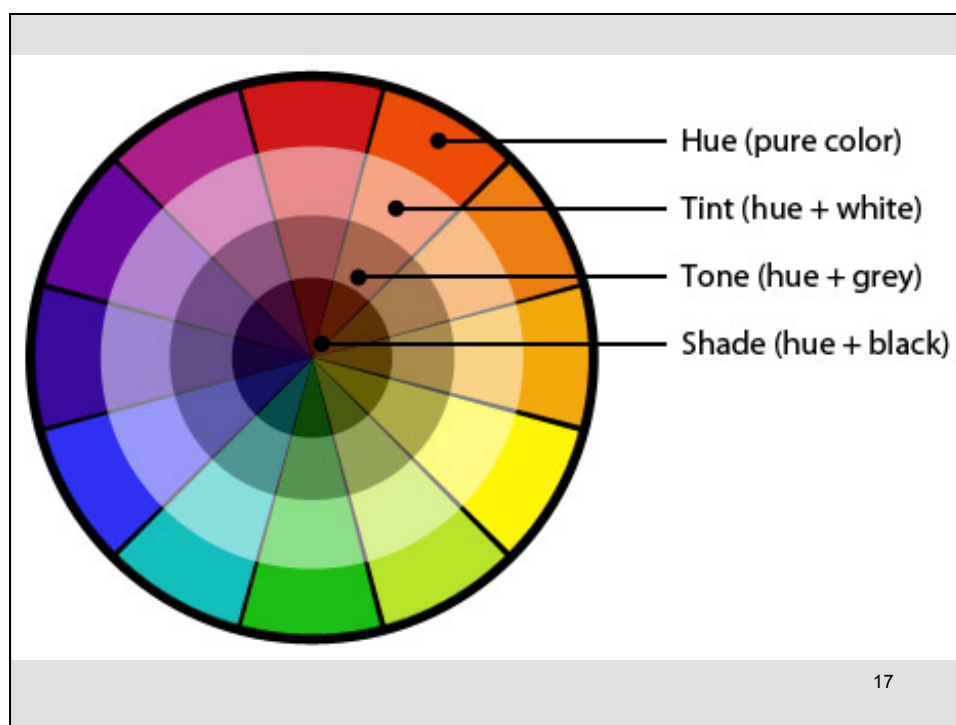
Shades - adding black to a pure hue



Tone - adding gray to a pure hue



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Colour Context



Is the same red used in all background colour tabs?

Is the red tab the same size in each background colour tab?

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Reading Colour



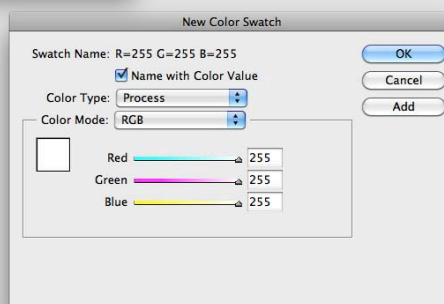
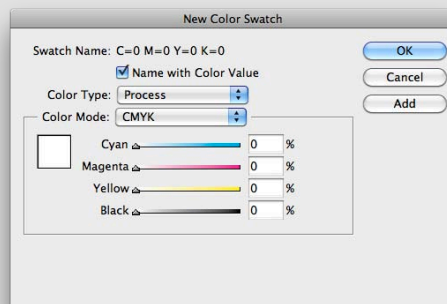
19

Spot and Process Colour

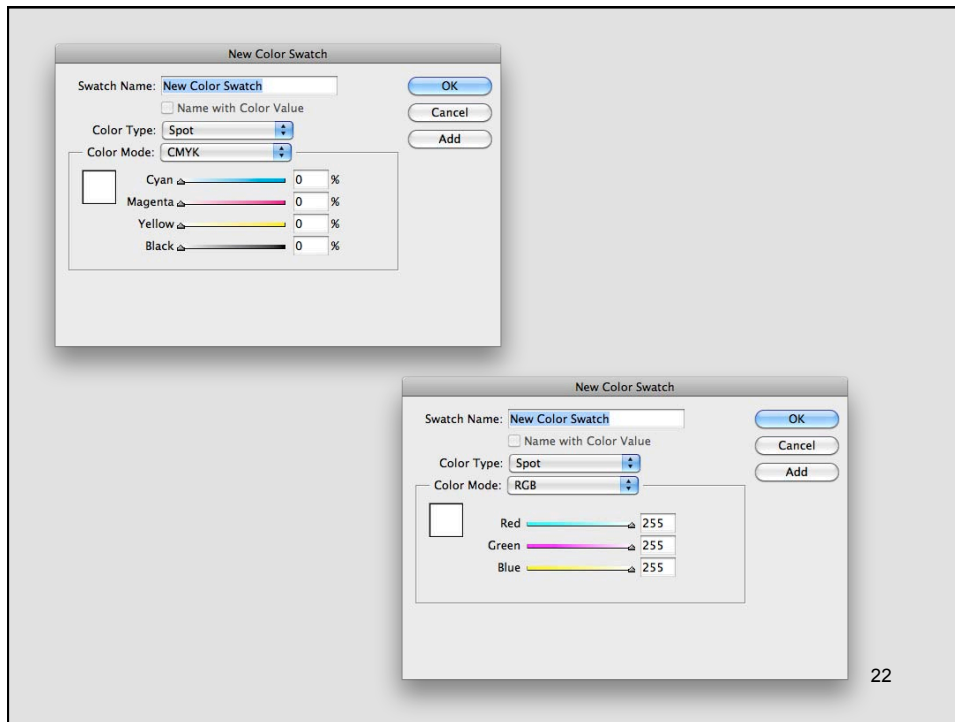
You can designate colors as either spot or process colour types, which correspond to the two main ink types used in commercial printing.

In the Swatches panel, you can identify the color type of a color using icons that appear next to the name of the colour.

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Using spot and process colors together

Sometimes it's practical to use process and spot inks in the same job. For example, you might use one spot ink to print the exact color of a company logo on the same pages of an annual report where photographs are reproduced using process color.

You can also use a spot color printing plate to apply a varnish over areas of a process color job.

In both cases, your print job would use a total of five inks—four process inks and one spot ink or varnish.

In InDesign, you can mix process and spot colors together to create mixed ink colors.

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Color Picker

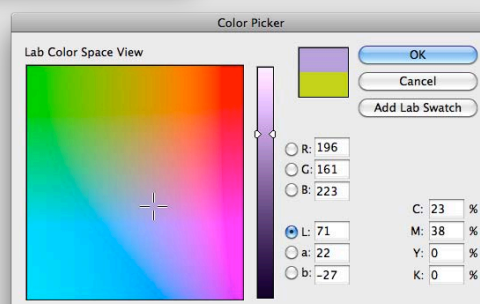
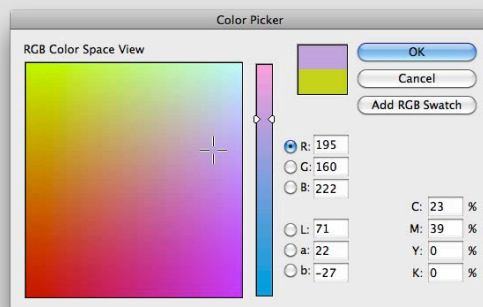
The Color Picker lets you choose colors from a color spectrum or specify colors numerically.

You can define colors using the RGB, Lab, or CMYK color model.

Double-click either the Fill or Stroke box in the Toolbox or the Color panel to open the Color Picker.

To change the color spectrum displayed in the Color Picker, click a letter: R (Red), G (Green), or B (Blue); or L (luminance), a (green-red axis), or b (blue-yellow axis).

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Most Visible

1. Black on Yellow

2. Green on White

3. Blue on White

4. White on Blue

5. Black on White

6. Yellow on Black

7. White on Red

8. White on Orange

9. White on Black

10. Red on Yellow

11. Green on Red

12. Red on Green

Least Visible

A large rectangle and a narrow line (or type) of the same colour will seem to have different values when placed against a white background: the colour in the line will look darker than it does in the rectangle, because it's surrounded by much brighter white space.

When two shades of the same colour, one dark and one light, are paired with each other, the darker shade will look darker and the lighter shade will appear to be lighter: a pink rose will seem to be paler against a purple background.

Larger colour spaces will affect the smaller ones: if a small square of medium yellow is surrounded by a larger area of black, the yellow square will seem to be brighter than when surrounded by white. Any colour will appear lighter against a darker colour and vice versa.

Outlining a colour in a darker shade will enhance the enclosed colour, helping to keep a colour from "spreading" into surrounding areas. On the other hand, a lighter outline will cause a colour to spread to adjacent colours, and reduce the strength of the enclosed colour.

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Defining a Colour Scheme

[Interactive Colour Picker](#)
(best opened in Firefox)

[Hewlett Packard Colour Wheel](#)



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