

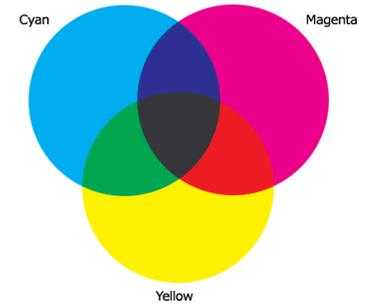
week::six

Troubleshooting Color for Offset Printing

CMYK Basics

It's a Subtractive Color System

- Color + Color + Color = Black (but not always)
- The “Off” color is the color of the printed-upon medium.
- *CMYK Printing Pseudonyms*: Process Color; Full-color; 4-color



It's All About the Ink

- In CMYK, we control exactly where ink is placed on the page, and exactly how much ink is laid down on paper.
- It is possible to place **too much ink** on the page.
- The measurement of the amount of ink in a single spot on the printed page is called **Total Ink**.
 - A common maximum is 280% total ink coverage (though this number, of course, varies based on the press, paper, etc.)

Measured in Percentages

- 0% – 100% per ink
 - 0% = no ink; 100% = maximum coverage
- Percentages can be added together.
 - For example, a 4-color press can print up to 400% coverage at a single spot.

One Color, Many Formulas

- Unlike RGB and LAB, there are **many different ways** to define a single color in CMYK.
- The reason for this is the addition of a fourth ink: **Black**.

Primary Color Formulas

Magenta + Yellow = Red	Magenta + Cyan = Blueish-Purple	Cyan + Yellow = Green	Magenta + Cyan + Yellow = Muddy Brown-ish

The Unwanted Color

- In creating the primary mixes above, adding the third color ink only pushes the color towards brown/neutral.
- Can be used to dull a primary color mix.

The Role of black

- Adding K to any of these mixes only *darkens* the color

Cyan is Not “Pure”

- Most cyan inks contain some magenta component
- CMYK Blue must contain more Cyan than Magenta
 - CMYK Blue is approximately 100c 90m 0y 0k
- Neutrals must contain more Cyan to actually be neutral
 - 50% gray is approx. 58c 47m 47y 8k

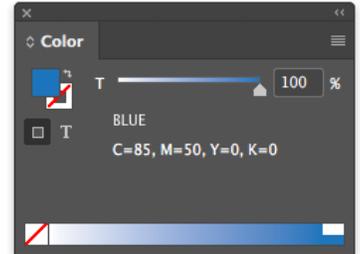
Yellow is the Weakest Ink

- It is easily contaminated by other inks

Working with Color in InDesign

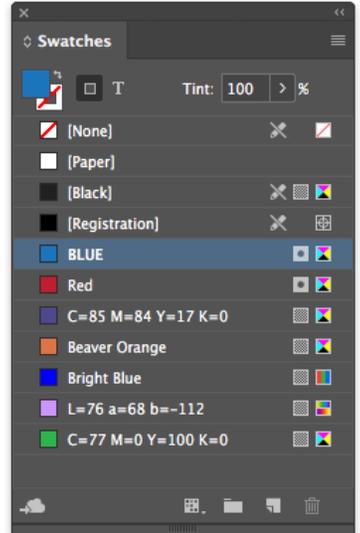
Panels

- Window > Color (F6)
 - Use for “casual” color selection. Do not use to specify a new color for a page element.
 - Best for setting the tint of an existing swatch color.
- Window > Swatches (F5)
 - Used for more “formal, methodical” color selections.
 - This is the panel to **define and manage** your colors.



Swatch Panel Iconography

- Swatches can be either **Process** ([Pattern Icon]) or **Spot** ([Spot Icon]) colors.
- They can be defined using the **CMYK** ([CMYK Icon]), **RGB** ([RGB Icon]) or **LAB** ([LAB Icon]) color models.
 - However, always use **CMYK** for print. Period.
- The [Registration Icon] indicates the Registration color.

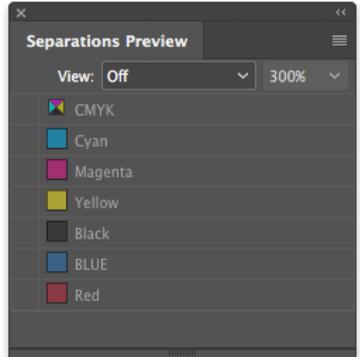


Special InDesign Swatch Entries

- [None]
- [Paper]
 - By editing the [Paper] swatch, you can change the color of the paper as it appears in InDesign.
- [Black]
 - See display options on next page.
- [Registration]
 - All inks outputted at the time of printing (including spot colors).

Separations Preview

- Window > Output > Separations Preview
- Creates a preview within InDesign or how each individual printing ink plate will appear when sent to a commercial printing press.
- Separations often reveal errors and inconsistencies in the technical make-up of ink in a publication.
 - This enables you to proof and troubleshoot a document *before* it gets put on the press, saving you and your clients money.
- The Separations Preview panel can show the **ink usage** and **total ink** of an artwork area simply by moving your mouse over your document.
- You can correctly view **Overprint** and **Knockout** areas of a layout before printing them out.

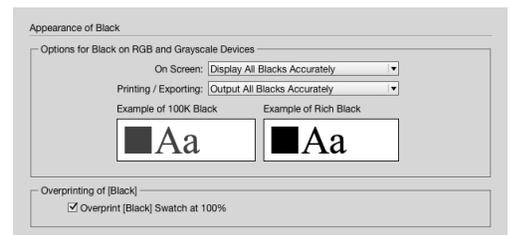


Flattener Preview

- Window > Output > Flattener Preview
- A tool to identify and diagnose elements with transparency and rasterization.

Display of Black

- InDesign > Preferences > Appearance of Black to control its appearance.
- For print work, be sure to set the display of black to *Display All Blacks Accurately* for on-screen viewing, and *Output All Blacks Accurately* for printing & exporting.



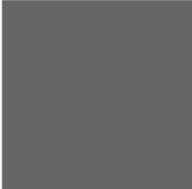
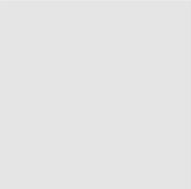
Overprinting & Knockouts

Knockout

- *Defined:* Removing the ink beneath another color.
- Ensures that unwanted ink will not contaminate a desired color.
- Is the default setting in most print circumstances.

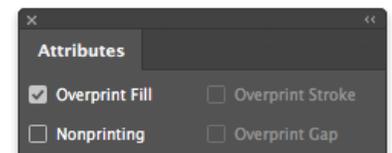
Overprint

- *Defined:* Printing one ink over another.
- Done to help prevent color registration errors, especially with type over a colored background.
- By default, **Black ink printed at 100% overprints** all other inks (since it is the most dark and opaque ink).

<p>Composite Example: 100% black G placed above a light blue background. (65c, 25m, 10y, 10k).</p>				
<p>Fill set to Overprint (default for text)</p>	 <p>C</p>	 <p>M</p>	 <p>Y</p>	 <p>K</p>
<p>Fill set to Knockout</p>	 <p>C</p>	 <p>M</p>	 <p>Y</p>	 <p>K</p>

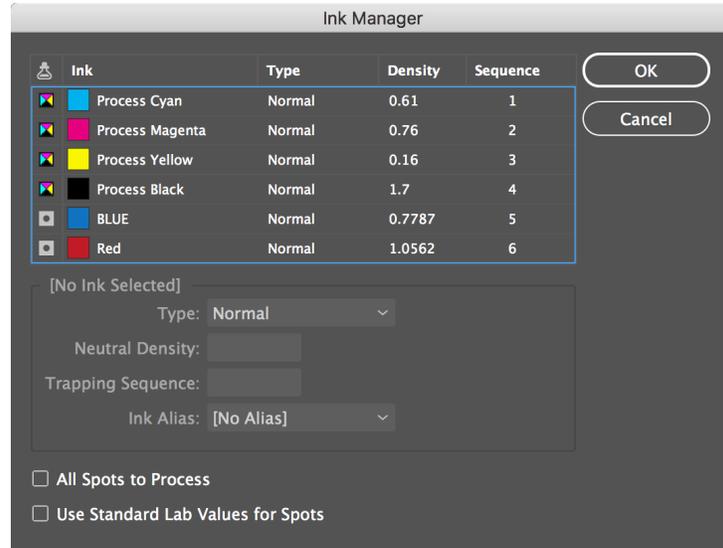
Attributes Panel

- Provides control of overprinting for specific page elements.
- Window > Attributes
- **Overprint Fill** forces InDesign to overprint the fill of an element.
- **Overprint Stroke** forces InDesign to overprint the stroke of an element.
- **Overprint Gap** controls the printing of color applied to the open spaces in dashed, dotted, or patterned lines.



Ink Manager Panel

- Swatches Panel Submenu > Ink Manager...
- Provides control over inks when output.
- Allows for the re-mapping of inks, including the conversion of Spot color to process colors.
- Example: CMYK plus two Spot colors



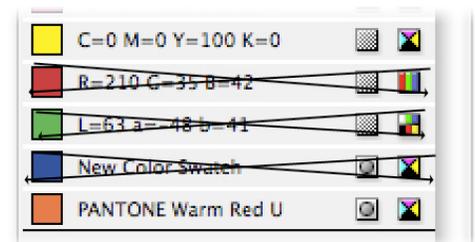
Troubleshooting Color in InDesign

Make sure your swatches are in the CMYK color mode.

- No RGB or LAB-based colors

Make sure Spot colors are Spots, and Process colors are Process.

- Use Separations Preview to see exactly how many plates you'll be generating.
- Use Window > Output > Preflight to check on the status of your inks.



Don't change the name of Spot colors—ever! This goes for both Illustrator and InDesign.

- Remember that imported .eps and .ai files that contain Spot colors will add their Spot colors to the Swatches panel.

Use tints of existing colors instead of defining new ones

- If the base-color of a tint is changed, all occurrences of that color are changes as well.

Use Window > Output > Flattener Preview to view potential problems area with transparency in your document.

Name your Process colors with the CMYK values.

- InDesign does this by default—use Name with Color Value option.

Remove unused colors from your Swatches panel from time-to-time, and before sending the job in for printing.

- Use the Swatches panel sub-menu > Select All Unused

Add existing non-Swatch colors to your Swatches panel automatically.

- Use the Swatches panel sub-menu > Add Unnamed Colors

Understanding Device Dependency

Device-Dependent Color

- A digital representation of color that is tied to a specific device.
- Every device has a different **color gamut**—that is, the range of colors a device can read, create, or display.
 - CMYK value will look different on different printers.
- Examples:
 - **RGB** on a computer monitor, TV, or projector (think of the different appearances of color on all those TVs at an electronics superstore, or the monitors in the lab)
 - **CMYK** when printing (think CMYK for the VC Color Printers vs. your home inkjet printer)

Device-Independent Color

- A method of storing color information that represents absolute color.
- When given a color number in a device-independent color model, that color will *always* be the same, regardless of other factors.
- **LAB** is the leading device-independent color model.
- All color must be converted to a *device-dependent* color model for viewing by using a **color lookup table**.

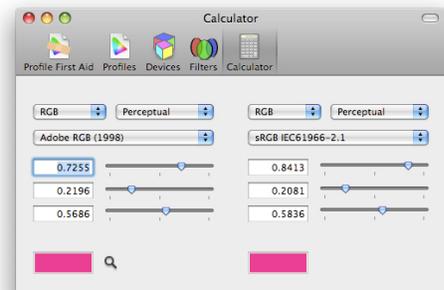
Working with Color Spaces

Overview

- Color spaces are a mathematical representation of the range of a real-world color device.
- Color spaces directly map colors in an image to colors of an input or output device.
- Scanners, monitors, mobile devices, TVs, and printers have unique color spaces, though some attempt to share one in common.

Two Key Color Spaces

- **sRGB:**
 - A narrow-gamut color space for computer monitors, TVs, etc.
- **Adobe RGB**
 - A wide-gamut color space for prepress photo retouching and editing.
- Both of the spaces use the RGB color model, but produce different results for the same color number. This makes RGB a **device-dependent** color model.
- The screenshot is from Apple's ColorSync utility. Note how a color has different numerical output values, depending on which color space is used.



Two Other Color Spaces

- **ProPhoto RGB**
 - Somewhat new, and not used very often.
 - Extra-wide gamut, encompassing 90% of the colors in LAB.
 - 13% of the colors are imaginary colors that do not exist!
- **P3**
 - Another wide-gamut alternative to sRGB
 - Began as a color space for digital cinema projection
 - Similar in gamut to Adobe RGB, but does not cover as many of the key colors used in offset printing.
 - Used frequently by Apple for their built-in screens, including iPhones and iPads.

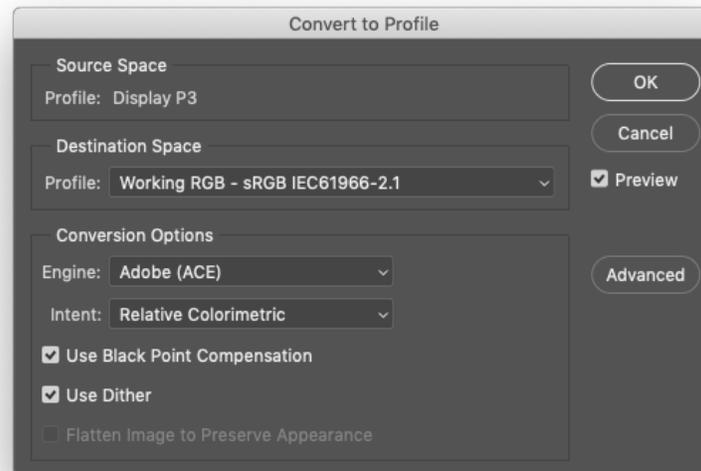
Conversion in Photoshop

Edit > Assign Profile...

- To begin managing a non-color-managed image.

Edit > Convert to Profile...

- To permanently convert a managed image from one space to another.



Spot Colors

Defined

- Spot colors are inks tinted to a specific color.
- This allows for a designer to add color to a document without the expense of using full-color offset printing.
 - For example, a newsletter might use black ink plus one Spot color (blue, etc.)
- Spot colors also allow for the use of specialty inks, like metallic and fluorescent colors that cannot be re-created using Process colors.
- In the U.S., the color standard used for inks is the **Pantone Color System**.
- InDesign and Illustrator have a number of built-in color swatches from Pantone, as well as other vendors.

