

COLOR SHIFT: Cause and Solution.

There are many factors that contribute to color shift on press in many of our books. The 2 colors that are notorious for changing to the point of being **different colors** are the Blues/Purples and the Beige colors. I collected many books with varying degrees of color shift in the Blue/Purple color. I spoke with several printers and here is what was discovered.

In all cases of color shift, the closer the CMYK color percentages were to a 1:1 ratio, in other words equal amounts of each color (C50M50), the greater the shift in color on press. Once the color ratio became greater a 5:3 ratio, ie. the one color percentage is 60% or less of the other color (C100M60, C60M100, C50M30), the difference in the colors due to shift is much less dramatic.

Cause: When a book is printed there are several things that occur which individually will cause a shift in color. Put them all together and you can have a dramatic change.

- 1. Gain: 12%-17% CTP, 17%-22% Film:** This is a function of ink absorption on paper. As the ink hits the paper, the color is absorbed and it spreads out. The amount of Gain is affected by 2 factors:
 - a. Paper:** The quality of the paper stock is the biggest cause of Gain. Imagine the difference between a Paper Towel and Photo-quality Paper. On the Paper towel one drop of food coloring may spread to the size of a plum, where as one drop of ink on Photo-quality paper hardly spreads at all.

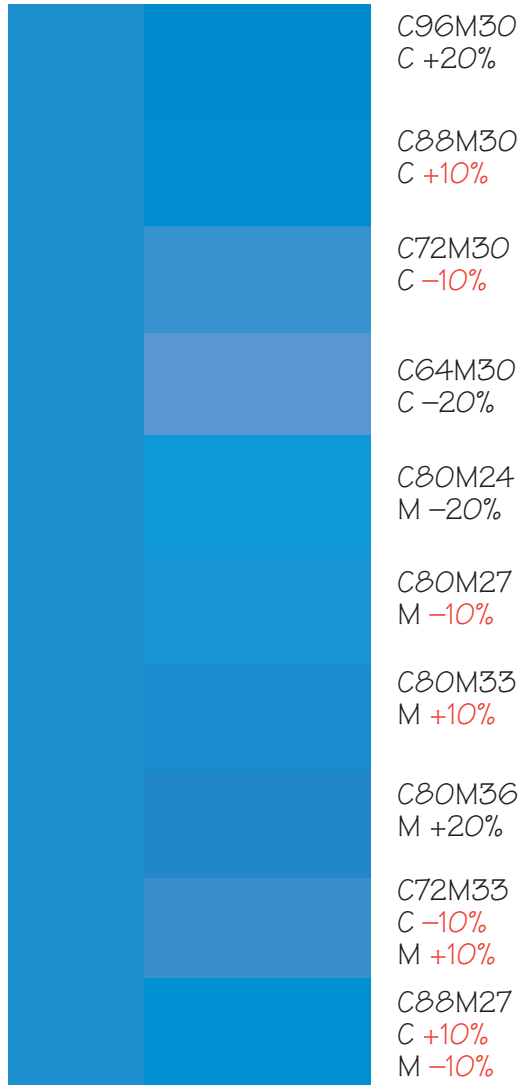
Another factor of paper is moisture content. The dryer the paper, the less Gain and moisture can vary within the same roll. The amount of humidity can change the Gain as well since the paper will absorb the moisture from the air.
 - b. Ink:** The viscosity of the ink will change the amount of Gain. The thinner the ink the more Gain.
- 2. Color Density: 0%-7%:** What this means is that the more of any one color you have on a page, the printer places more of that one ink color on the plate. This occurrence affects all the other colors on the same page and following page that contain that color.
- 3. Press shift: Less than 2%:** What this means is color shift caused by the actual machinery of the press itself.

So on the whole, **Gain** on press is the biggest culprit of causing the shifts in color that we have been seeing.

Solution: Well this is a tricky problem, but fortunately we are only dealing with a few colors that are the biggest offenders. Since Gain is the biggest problem, we either need to use the highest quality paper around (lots of \$\$\$ and you know how the budget has been) or we try to avoid using blue colors that **exceed** the 60% ratio.

On the next pages you will see 6 actual colors used in our books and what range of color shift is possible. I have shifted the colors 10% and 20%, though the 10% changes are the ones that will probably be most common.

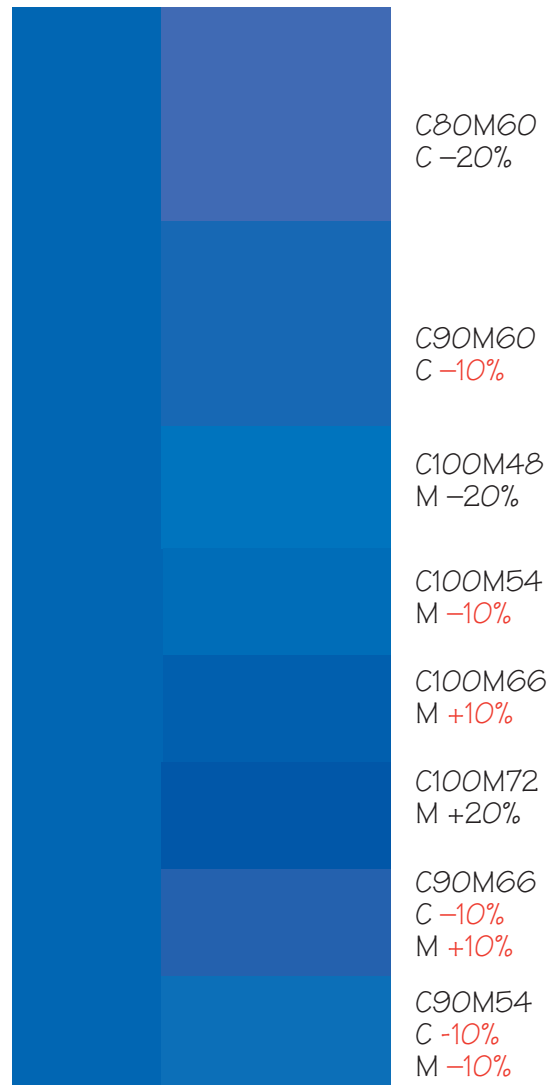
C80M30



38% color ratio

Ketchum MOUS
Figure Numbers
Slight variation over 20% but close enough to recognize as same feature.

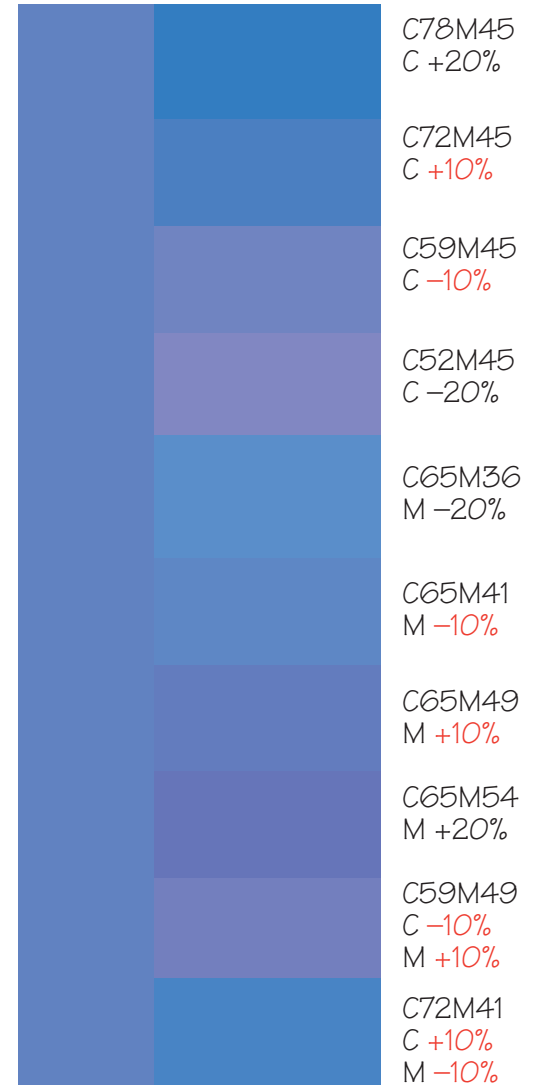
C100M60



60% color ratio

Hoffer MSAD
H1's and H2's
Slight variation over 20% but more variation from the 38%.

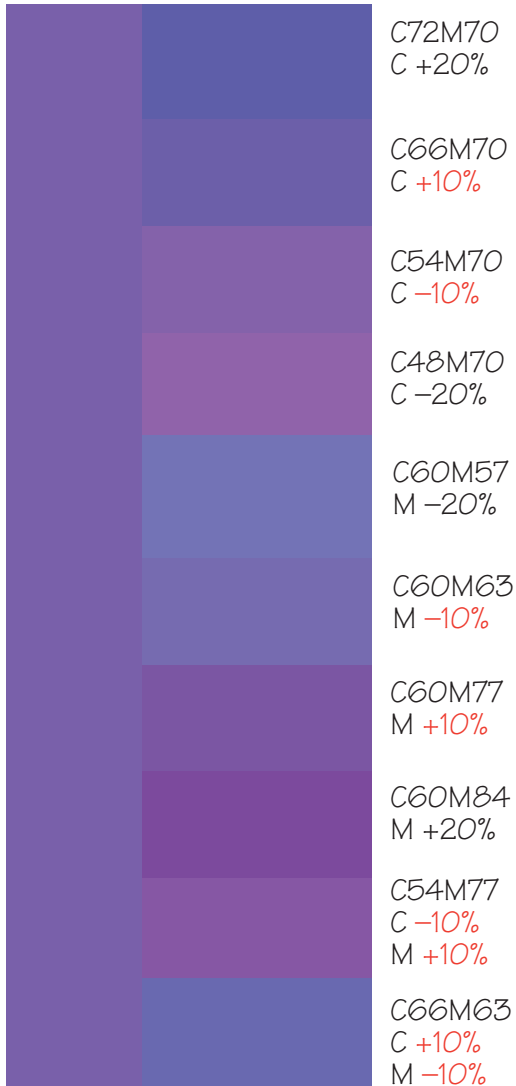
C65M45



70% color ratio

Gomez-Mejia Managing Human Resources
H1
Moderate color shift.

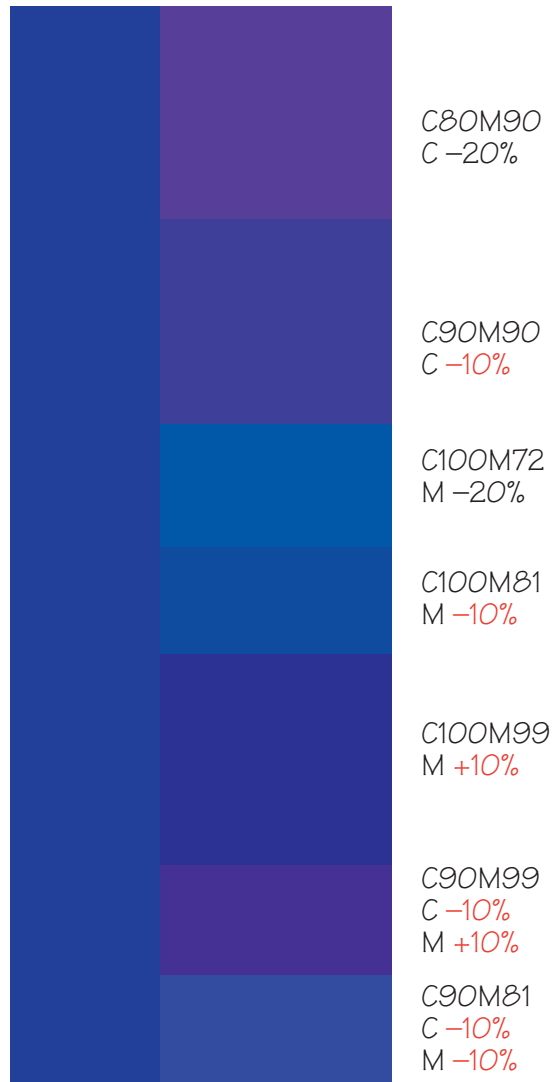
C60M70



85% color ratio

Daniels Globalization and
Business
H2
Fairly extreme color variation.

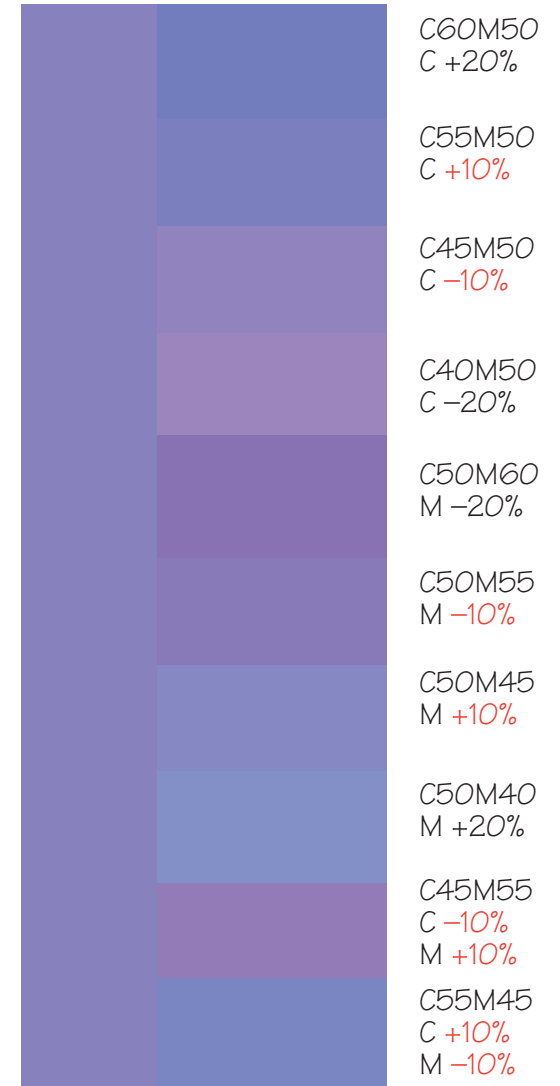
C100M90



90% color ratio

Harrell Marketing
H2
Extreme color variation. The density
of both colors make the shift less
dramatic than the previous.

C50M50



100% or 1:1 color ratio

Russell/Lane Advertising
Procedures
Folio Number
Extreme color variation due to
the even amounts of each color.

Multi color usage and Registration refresher

Black ink always over prints so no registration problems.

You must have a common color of at least 5% between the background and the foreground or you can get a white halo if the registration is off at press. Registration is the accuracy of placing one set of color dots over the others to create the CMYK color.



Cyan



C100M48



C70Y30K10



C70M60Y10K10

Colored Rules:

Minimum weight for 1c -4c Lines.

1 hit color rule can be between 1pt and .5pt wide and still print correctly.

2 hit color rule must be at least 2 pts wide to print correctly.

3 hit color rule must be at least 3 pts wide to print correctly.

4 hit color rule must be at least 4 pts wide to print correctly.

Colored Text:

Minimum size and weight for 1c -4c Text.

Tekton 1 color text
Times 1 color text
Helvetica 1 color text
can be any font size or weight

Tekton 2 color text
14pt Bold
Times 2 color text
16pt Bold
Helvetica 2 color text
14pt Bold

Tekton
32pt bold
Tim
72pt Extrabold
Helvetica
22pt bold

Tekton
46pt bold
Tim
96pt bold
Helvetica
30pt bold