

TIC/TAC

Total Ink Coverage

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This tutorial was originally prepared in 2013. The version of Acrobat at that time was 11, and screen shots are from it. The current version, Acrobat DC Oct 2024, has the same functions.

I believe that digital printing, of the inkjet and laserjet types, is not particularly sensitive to high ink coverage. However, it is not unreasonable for printers to set limits.

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TIC/TAC

Total Ink Coverage (TIC) or Total Area Coverage (TAC), or total ink density (all synonyms) refers to the maximum total amount of ink on a page in one area. Most commercial color printing is typically made up of CMYK, cyan, magenta, yellow, and black. The maximum amount of ink for each color is 100%. If all four colors were printed at maximum, the TIC would be 400%, which is called registration black.

- Sheetfed offset on coated paper (typical commercial printing jobs): 320 to 340%
- Heatset web offset (such as magazines): 300 to 320%
- SWOP: 300%
- Non-heatset web offset on uncoated paper (such as newspapers): 240 to 260% (In a 2011 analysis of thousands of advertisements that were sent to Dutch newspaper printers, 53% of all those ads had a TAC above 240%. The prepress systems at those sites fix this by ‘reseparating’ the files – which is not too difficult to do with today’s prepress systems but it is still a major hassle).

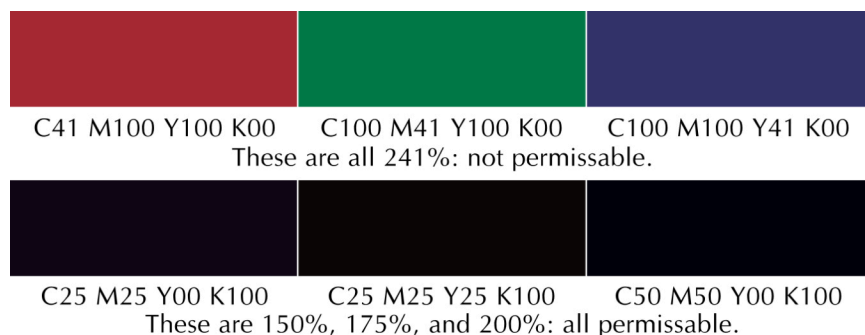
KDP does not mention TIC, or anything like it, and therefore does not set a limit. IngramSpark, on the other hand, recommends a limit of 240%—I am unaware of IS blocking a book for going over 240%, but they reserve the right to. I have printed with 300% to 400% using KDP, with no problems. However, I have no way of knowing if they actually printed 400% or something under that, which is easy to do in a digital printing environment.

In traditional, non-digital, printing there are a number of reasons for keeping the TIC low. High TICs:

- Can wet the paper too much causing cockling (warping)
- Can cause thick layers of sticky ink can cause the paper to pull apart in printing
- Can often produce muddy colors
- Can cause problems with lamination (covers)

I think that most of these do not apply to digital printing, although I do not know. The fact that IS warns against exceeding 240% suggest they do; but KDP not caring, suggests they don’t?

Some advice might seem obvious, but, arguably difficult. For example: “. . . Avoid big blocks of dark color in your background and images” (<http://www.newselfpublishing.com/TotalInkLimit.html>, 31 July 2012). As a practical matter, this is not so easy.



To me, knowing that these are black and registration black, I would have guessed the color was under 240% and the black over!



Meeting requirements like 240% TIC means having professional graphics software. Programs like GIMP are good, but they do not let you work in CMYK.

You can create custom CMYK profiles in Photoshop where you can set a Total Ink Limit. Acrobat has similar features. If you have lots of images, setting the TIC to say 238% automatically might be well worth it just for saving time.

The advice that most people probably follow—if for no other reason than it comes up on the first page of a Google search¹, is:

1. Open your image in Photoshop. If you have any other adjustments to make to your color space, do them now. Otherwise, it's best to start with your graphic in an RGB version rather than in one already converted to CMYK.
2. Go to Edit > Convert to Profile, or in older versions, to Image > Mode > Convert to Profile. Under Conversion Options, use these settings:
 - Engine: Adobe (ACE) Intent: Relative Colorimetric
 - Use Black Point Compensation: Yes
 - Use Dither: Yes
3. For the destination space profile, choose "Custom CMYK." If you get a warning about color management, click "OK." Then, in the new dialog box, enter these settings.
 - Ink Colors: SWOP (Newsprint)
 - Dot Gain: 25%
 - Separation Type: GCR
 - Black Generation: Medium Black Ink
 - Limit: 100%
 - Total Ink Limit: 238%
 - UCA Amount: 0%

I have used this system successfully several times.

I think that doing it yourself will give you a better image, where you have better control over the outcome. There are several reasons.

The first problem is that if your art work is in sRGB—the color mode of consumer cameras, scanners, and the default color mode for most graphics programs—there is a reasonable chance that it has out-of-gamut colors. Relative Colorimetric, as recommended above, preserves the in-gamut colors and it clips the out-of-gamut colors to the nearest in-gamut color on the gamut husk. This is a destructive conversion (rendering intent): it cannot be reversed. Whereas Perceptual rendering tries to preserve the relationship between all color by adjust them all, in-gamut and out-of-gamut color. This means that the in-gamut colors won't be as accurate. It is a non-destructive rendering intent: it can be reversed.

The second issue with this method is that it is global: it effects the entire image.

In both instances, Relative rendering and using the custom CMYK, the net effect is to mute

¹ December, 2013 <<http://www.newselfpublishing.com/TotalInkLimit.htm>> by Aaron Shepard. As of this revision, that page does not exist; but there is a link to <http://www.newselfpublishing.com/index.html>

rich, saturated colors, and to distort what could be called the perceptual accuracy of the CMYK color values. Commercial printing rarely produces an image better than the original. If it is compromised at two corrective points, many images will never print as well as they could.

Of course, many people might not care, the images print well, the sRGB color is in-gamut, or the affects of either sRGB to CMYK or a high TIC are negligible. Given the ease of simply converting images globally, there is a lot to be said in behalf of this method. If however, the colors shift in ways that alter the image too much, there is a second, more controlled process.

Convert the image to CMYK, using Perceptual Rendering Intent. Do any basic color corrections needed to improve the image: comparing it to its sRGB original.

You can find out if you have too high an ink coverage by either:

- Open the a PDF of the image in Acrobat (not Reader).
- Tools > Print Production > Output Previewer
- Tick *Total Area Coverage* and set the maximum value.

The lime green can be changed to any other color; and the maximum ink coverage can be reset. I find it



Output Previewer

Simulate

Simulation Profile: **Output Intent: U.S. Web Coated (SWOP) v2**

☒ Simulate Overprinting Page has Overprint: **No**

☐ Simulate Paper Color ☐ Set Page Background Color ☐

☐ Simulate Black Ink **Ink Manager**

Show

Show: **All** Warning Opacity: **100** %

☒ Show art, trim, & bleed boxes **Set Page Boxes**

Preview: **Separations**

Separations

Name	
☒ Process Plates	
☒ Process Cyan	35%
☒ Process Magenta	84%
☒ Process Yellow	99%
☒ Process Black	49%
Total Area Coverage	267%

Sample Size: **Point Sample**

☒ **Total Area Coverage** **240** %

Page has Transparency: **No**

Transparency Blending Color Space: **None**

Tools Sign Comment

Content Editing

Pages

Interactive Objects

Forms

Action Wizard

Text Recognition

Protection

Document Processing

Print Production

Preflight

Output Previewer

Edit Object

Flattener Preview

Convert Colors

More Production

Set Page Boxes

Add Printer Marks

Fix Hairlines

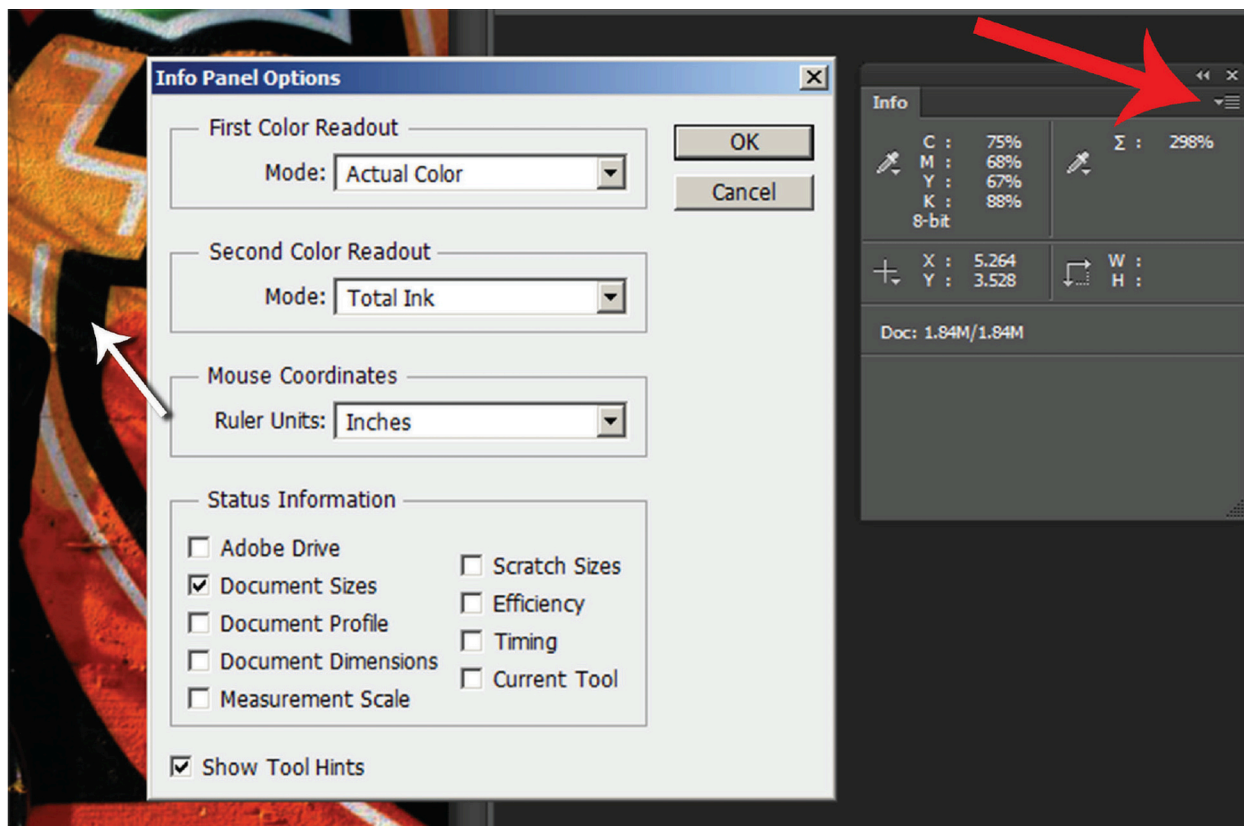
Ink Manager

Trap Presets

Acrobat Distiller

easier, in the following method, to save the image periodically as a PDF and then use this to quickly see where the problems are.

The other method, and both should be used, is to bring up the Info window, then click on the Info Panel Options button (red arrow), and set the second color to Total Ink. To change the very dark blacks, for example, select them, here are several methods:



- Make a small selection of the black anywhere it is over 240% (check the TIC in the info window), then click Select> Similar.
- Use the Magic Wand Tool to select the black.
- Use the Select > Color Range then use, for example, set it to Sampled Color, use the eye dropper

Then go open Layer > Adjustment Layer > Selective Color.

In this example, you would select Colors: Blacks, then you can reduce the Cyan, Magenta, and Yellow, while increasing the Black if necessary. You can watch the effect and by mousing over the image you can see the Total Ink Coverage in the info window. See image on page 8.

In the following image, I had to work do the black, and other color areas, maybe about six or so selections to arrive at an image that would pass the 240% limit (with a few dots of higher TIC), and would maintain the basic colors relationships in the original.

The first method (bottom left) is flat and less rich than the second method (about 20 minutes to adjust the TIC). Nothing was done to correct the color and a lot could be done with more



RGB Original



CMYK Conversion



Global TIC Fix



Controlled TIC Conversion

time (but that was not the point to this exercise).

Here is the PDF version of the Controlled TIC Conversion, with the TIC showing at 240% and above.



Whether every image is worth the time, I can't say. However, image preparation is important whether you correct for TIC, or sRGB to CMYK color issues. Because the printing can rarely if ever be better than the original, it is generally best to keep each state of the image at its best.

Because this is about using Photoshop, please use adjustment layers, they are non-destructive and permit infinite adjustments. Flatten a copy to use in your book.

Below is the Selective Color adjustment layer. The marching ants disappeared when the panel came up. The black values have been pushed to the to create purple, so you can see that the process is interactive and correctable.

