Introducing PrintWide™

PrintWide is an extremely large-gamut CMYK dataset designed to encompass the gamut of virtually all inks or colorants in all known color printing systems. Although the dataset has only four channels (CMYK), its gamut includes the effect of typical "extended-gamut" inks such as OGV (Orange, Green and Violet) or RGB (Red Green and Blue) often used in ink-jet, flexo or offset printing.

Note: PrintWide is primarily intended for wide-gamut or extended-gamut printing workflows and offers no particular advantage for normal 4-color offset or flexo printing.

PrintWide was developed with two main purposes in mind.

Purpose 1: CMYK Translation Space

The first purpose of PrintWide is to act as an intermediate CMYK "translation space" into which highly saturated original images (usually RGB) can be converted without losing color fidelity.

When the final printing method is not known, converting first into PrintWide optimizes the important gamut compression function for wide-gamut printers and preserves virtually all of the original's color information. By comparison, converting into a smaller profile like GRACoL or fogra 51 irrevocably destroys some very saturated color detail and accuracy.

A second advantage of PrintWide is that it allows wide-gamut CMYK images to be edited or assembled in programs like Adobe Photoshop, Adobe Illustrator, Adobe InDesign, Affinity Photo, Affinity Design, Affinity Publisher, etc., that typically cannot handle, or accurately display, images in more than four channels.

Purpose 2: Saturation Booster

The second purpose of PrintWide is to act as a "saturation booster" profile that, when assigned to a CMYK file intended for a medium-gamut printing process like offset, takes advantage of the higher color saturation and contrast available on wider-gamut systems while maintaining a pleasing reproduction. This can be useful when a client asks for "more color" or "more punch" and does not need perfect color accuracy.

If the PrintWide.icc profile is assigned to an image that was originally converted to a G7® profile like GRACoL®, when that image is then converted to an actual wide-gamut printer's space, the effect will be to;

- Maintain perfect G7 tonality and gray balance
- Stretch pure whites and blacks to the maximum contrast available on that printer without losing detail or altering overall lightness
- Boost saturated colors without shifting their hues
- Protect critical memory colors – especially flesh tones – from over-saturation

An example of the saturation difference between PrintWide and GRACoL is shown in Figure 1. Note how lightness and gray balance remain similar while saturated colors are enriched.

Assigned: GRACoL 2013.icc

Assigned: PrintWide.icc

Figure 1: Typical effect of assigning PrintWide to a normal CMYK image. (Images courtesy BVDM). The saturation difference seen here will depend on how this document is reproduced or viewed.

Typical workflow 1: Translating an RGB image into PrintWide

1. If not already done, install PrintWide.icc in your ICC profiles folder.
2. In Color Settings, make sure *Use Dither (8-bit/channel images)* is checked.

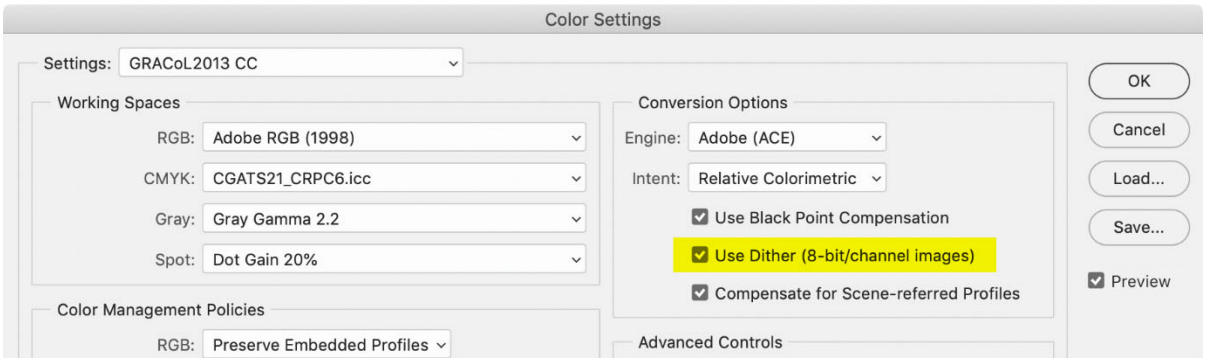

Figure 2: Dither is recommended when converting from PrintWide to the output profile.

3. Note that for maximum smoothness, wide-gamut RGB images should ideally be supplied in 16-bits / channel. If the original image is 8-bits/channel, it should ideally be converted to 16 bits/channel, e.g. with Photoshop's *Image – Mode – 16 Bits/Channel* command, before converting to the final output space.
4. Convert the image to PrintWide using the *Edit – Convert to Profile...* command, with Intent set to either *Perceptual* or *Relative Colorimetric* with *Use Black Point Compensation* and *Use Dither* checked.

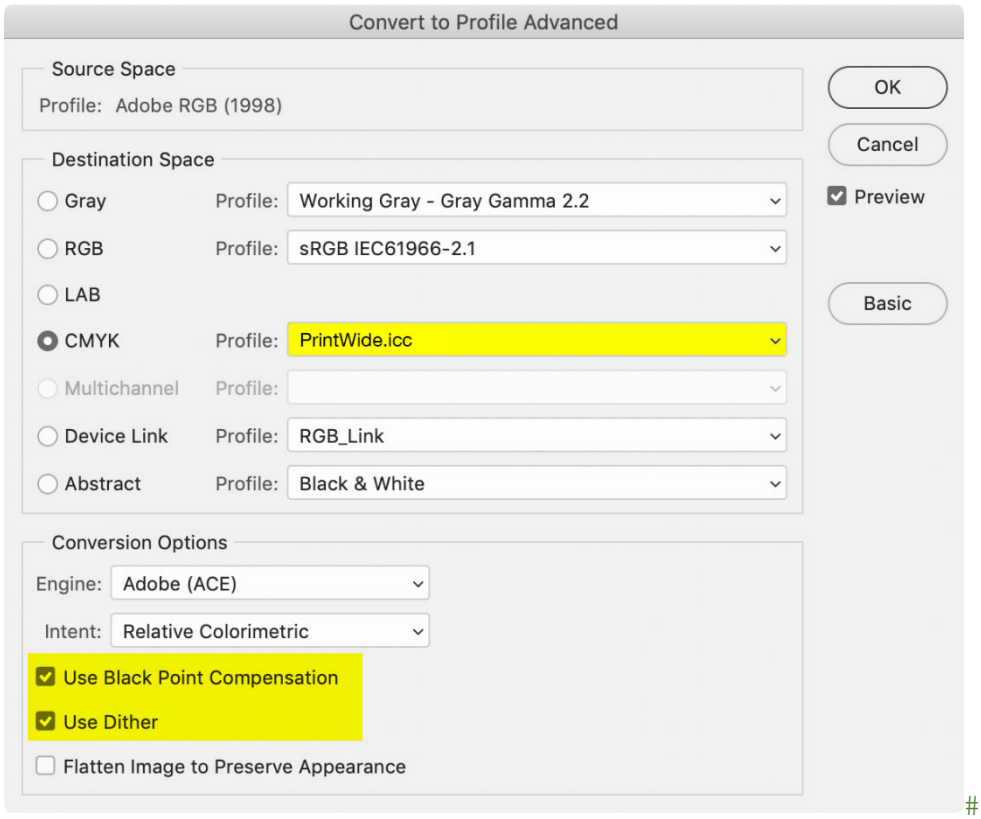

Figure 3: Recommended conversion options in Photoshop.

5. Save the new CMYK image, taking care not to over-write the original RGB file.

Typical workflow 2: Boosting saturation of a CMYK image in Photoshop

1. Put PrintWide.icc and your wide-gamut printer's profile into your ICC profiles folder.
2. Open the CMYK image you want to boost.
3. Assign PrintWide.icc using the *Edit – Assign Profile…* command and note the increased saturation on the monitor image.
4. If the increased saturation is what you wanted, proceed to the next step. If the image looks too saturated, use the *Hue/Saturation…* tool (ideally as an adjustment layer) to reduce over-saturation as needed, either globally or in specific colors.
5. EITHER convert the image to your printer's profile using the *Edit – Convert to Profile…* command, OR send it to the RIP for automatic conversion (see workflow 3). In either case, the best rendering intent will normally be *Perceptual* or *Relative with Black Point Compensation*.
6. Note that after conversion (or printing) the color boost may not perfectly match what you saw on screen, depending on how your printer's actual gamut compares to PrintWide, the accuracy of your display system and other variables.

Typical workflow 3: Creating an automated saturation-boost RIP workflow

Note: Before setting up an automatic RIP workflow, check whether PrintWide suits your kind of work using Photoshop (see workflow 2).

1. Make sure PrintWide.icc and your wide-gamut printer's profile are loaded in your RIP.
2. If you want all CMYK images to be boosted, in the Color Management setup panel for CMYK images, select "*Ignore Embedded Profile*" (or equivalent) and select PrintWide.icc as the default CMYK source profile.
3. If you only want some CMYK images to be boosted, in the Color Management setup panel for CMYK images select "*Use Embedded Profile*" (or equivalent) and assign PrintWide.icc to individual images in Photoshop or equivalent (see Workflow 2).
4. Set the CMYK Rendering Intent to *Relative with Black Point Compensation* (if available) or, if BPC is not available, set the intent to *Perceptual*.
5. Send a few test CMYK images through the RIP and compare the results with your normal workflow, i.e. with the original CMYK profile assigned.
6. For RGB images, select "*Use Embedded Profile*" (or equivalent) and the rendering intent you normally choose. Note that RGB images will not be boosted. They will be reproduced normally to the limit of your printer's gamut.

Important cautions and limitations

- If a PrintWide image is converted to an 8bit/ channel file with dither OFF, fine color gradients and smooth pastel areas will likely show "banding" or quantization. This is because when the wider chroma range is divided amongst the 256 chroma levels in an 8bit file, the difference between adjacent levels becomes much more obvious.
- When used as a saturation booster, the color produced by PrintWide will be inaccurate compared to the original profile. Be sure to explain this to end clients and show some example side-by-side images.
- Unlike GRACoL and the other seven G7-based CGATS.21 CRPCs, PrintWide does not represent a "real" printer or printer class. For accurate color matching, it will always be necessary to convert from PrintWide into an actual custom printer profile.

Test suggestions and questions for new users:

1. Convert some highly saturated RGB images into PrintWide, then convert from PrintWide into your printer profile using Relative with Black Point Compensation. Next convert the same images directly into your printer profile. Do you see any differences?
2. Repeat with the Perceptual rendering intent.
3. Assign PrintWide to a CMYK image, then convert into a wide-gamut printer profile with dither On and Off. Print the two side by side. Do you see any difference in quantization?
4. Open the converted images from test 3. and inspect in Photoshop for quantization on screen. Can you see any difference?
5. Using workflow 2 or 3, evaluate PrintWide as a saturation booster for a wide range of images. Compare the printed results with normal reproductions of the same images. Are there any colors you consistently don't like? Would the results be generally acceptable for clients who want maximum color but don't need an exact match?
6. Is your printer/ink combination capable of producing colors outside the PrintWide gamut? If so, please send us your printer profile.

For use as an Input/Source Space in RIPs and Color Servers

Using PrintWide as a target print condition when printing to digital print devices is easy. All you need to do is select PrintWide ICC file as the input or source profile in your rip:

1. Copy the PrintWide ICC file into the ICC folder on your system or RIP. (Location will vary depending on the RIP)
2. In the color management tab select PrintWide as the source or input space for your RIP
3. Select your media profile and linearization as you normally would as your output profile.

The PrintWide profile will work with your output profile to maintain as much of your printer's gamut as possible, will still maintaining G7 gray balance and tonality.

About Idealliance

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Contributors

PrintWide was designed with input from across the industry by the Idealliance Print Properties Committee (PPC). Contributors include Thorsten Braun, Marc Levine, and Don Hutcheson.

