

REPRODUCING INK COLOR

HOW TO MATCH BLENDS, RUN AFTER RUN

By Frank Burgos

Among the most stubborn challenges that flexo press operators face, reproducing color—run after run—has to rank close to the top. It seems as though somehow, even when we use the same ink color formula or the very same ink that was left over from a previous run, a given color doesn't always match from one run to the next. Very often, ink color has to be adjusted at the expense of press time. That's not good.

If you face similar challenges, consider some procedures and ink formula-naming methods that will enable you to more consistently blend ink with fewer color adjustments needed to subsequent batches. You will have less downtime and waste resulting from color adjustments; create less surplus ink; and even be able to reduce your base ink inventory. Diligence will be required in documenting ink base quantities used to create formulas, as well as other color-production variables. You may even need to develop a few new habits. The effort, however, will be well worth it.

The process of matching ink color involves weighing and blending ink bases, making ink drawdowns with a hand-proofer, printing the color at press, making color adjustments and comparing color—either by eye or color-measuring instruments—at various times. Each step has its own set of procedures, and they can vary from shop to shop, as can the instru-

ments used. The process discussed here, however, can be adapted to any flexo shop.

To demonstrate the concepts, imagine a scenario where we will print a simple two-color job (two colors so that we can look at a custom ink name as well as an industry color standard name in the same example). We'll use PANTONE® as our standard for one of the colors, but if you use another standard in your plant, you can just substitute that for anywhere the term "PANTONE" is used here.

The customer communicates the colors desired. You blend ink bases and match the colors away from the press, ahead of time, using a hand-held ink drawdown device to save press time. Based on the weight of each of the base colors in the blends you make, you calculate the formulas of each color. You send the ink to the press. The printed colors are slightly off. You make one or more adjustments to shade and/or strength of each color at press. (This occurs because the hand-held drawdown device does not mimic press conditions precisely.) You match the colors at press and you print the job. At the end of the job, you store the surplus ink for re-use.

Sometime in the future, your customer requests more of the same printed item. This time, you use the same ink that was left over from the previous run, and it's in perfect condition. One or more of the following variables affecting color, however, has changed:

- The press.
- The anilox geometry.
- The 'specific' anilox, even though the geometry is the same as before.
- The substrate.
- Overprint coating has been added, omitted or modified.

You start printing. The colors generated—using the same ink you used previously—are slightly off-shade, requiring you to make adjustments to the color at press. You match the colors again and start printing. Because it's a long job, additional quantities of ink become necessary. You blend more according to the formulas you calculated the first time you ran the job, guessing at the additional amounts of base colors you added at the press. You add it to your press's ink system and discover that the color is slightly off-shade! You shake your head, grit your teeth. You match color. You print the job a third time. The colors don't match!

If this sounds familiar, you are not alone. Fortunately, very little needs to be added or changed to the process outlined above to close some of the gaps and greatly improve your ink-blending success. Now, let's go into greater depth, stopping along the way to discuss some of the critical points.

Customer Communication

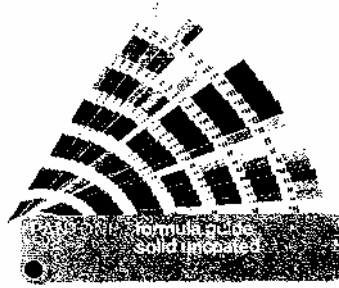
There is more than one way that your customer can communicate a color. He may provide you with a sample that your competition is printing for him; refer to a color in a standard guide, such as a PANTONE color book; or direct you to a color on a business card, letterhead or article of clothing. He may even provide numerical data from a colorimeter or spectrophotometer.

Regardless of the method, you need something to go by so you know exactly what each color should look like when printed. Whether it's a sample, guidebook, or numerical data, we will refer each of the colors we are to match to as the Printed

Color Standard for that color. It is the standard against which you will compare the printed color.

For each color we develop, we will create at least two standards: the Printed Color Standard described above and the Drawdown Color Standard. The Printed Color Standard, or PCS, will assume the name given to it by the customer. The Drawdown Color Standard, or DCS, will assume the longer ink-formula name that will aid in the management of ink-color blending and matching. In our two-color example, the customer calls the colors "ABC Blue" and "PANTONE 185 Red." The blue is a custom color name, so we will automatically include "ABC Blue" in the formula name of the ink blend we develop for this color on this job. The PANTONE 185 Red is a well-known and recognized color. It looks like we will be using "185 Red" within the formula name of the second blend.

However, when the sample makes it to the press with the work order,



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the operator compares the color of the sample to his current PANTONE color guide and notices that the red

on the sample is not a good match against the color standard in his color book. IT IS TIME TO ADDRESS THIS RIGHT NOW!

If it is not an exact match to a PANTONE color or any other standard color, you must clear the matter up. There are only two choices: 1) The customer (authority) agrees that you will create a custom color name (ABC Red, perhaps) and that you will match the sample provided; or 2) the customer agrees that you will match to the standard color guide.

If you decide to disregard the matter and match the sample while still calling it PANTONE 185 Red, you and/or the customer will run into all sorts of color-matching and consistency problems down the road. It is critical to be clear on this first step.

Fortunately, in our scenario the customer suspects that the shop that printed the sample did not match the color correctly, and confirms that his plastic bag and folding carton printer also are

matching to PANTONE 185 Red for his logo. Therefore, we will indeed be using 185 Red within the name of the blend we create for the red.

Match Color in Advance

Ink should be blended to color ahead of time, away from press, whenever possible. Adjusting color at press is bad enough; creating a new ink formula from scratch at the press is worse. That said, it is not feasible to predict and draw down in the lab or away from the press the exact same film thickness that will be generated by the press. There are simply too many variables involved to mimic press conditions, no matter how expansive your inventory of handheld anilox rolls. Therefore, at this stage, you match the ink batch you are creating to the PCS and hope that it comes close when finally on the press. You should have some idea of what to blend together, but expect to make adjustments at press.

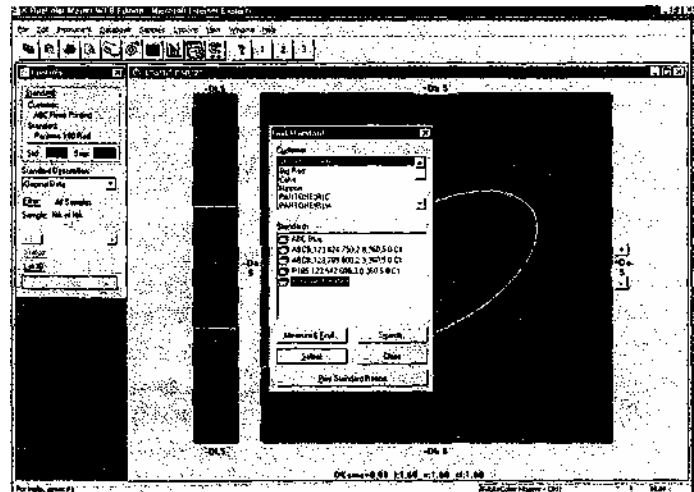
When blending, carefully record how much of each ingredient you add to create your first batch of ABC Blue and 185 Red. Record the quantities by weight, keeping track of each addition so that you can total each base weight once you're satisfied with these colors. Whether you work with ounces, pounds, grams or kilograms is not important, as long as you are consistent with the weight units throughout your calculations. From the base weights, calculate the formulas for the blends. These will be the initial formulas for these colors.

Ink Goes to Press

Remember not to be surprised if you need to adjust the colors at the press now. The hand-held drawdown device does not mimic press conditions precisely. You ink your press and pull up color. Then you add a few ounces of reflex blue, an ounce of yellow and a couple of pounds of extender to the ABC Blue and make similar adjustments to the 185 Red.

The adjustments done, you make notes to the color formulas for the next time you blend the color. You will have to edit the formulas the next time you mix this color, but it is not necessary to do it yet. You will do this as you weigh out the bases again the next time you blend this color. For now, simply note the approximate

This image shows a folder for customer "ABC" the customer in our scenarios. Included are the PCSs and DCSs, with their respective short and long names. Photo courtesy of X-Rite Inc.



amount of each ingredient you added to match the color and add comments to your formula notes.

Create Drawdown Standards

This is, perhaps, the most significant part of the process. As soon as you are satisfied with the color match at press, take wet samples of the blue and the red ink from the press and make drawdowns with a hand-held drawdown device (proofer). These will be the Drawdown Color Standards, or DCSs, for these colors, and they will become the standards you match to in the lab when blending subsequent batches of these formulas. They may differ in appearance from the press color standards, but they were created by the same inks that matched at press. This solves the problem of hand-proofers not mimicking press conditions, as now you will match a drawdown to a drawdown made with the same hand-held device.

It is important to document which device you use to drawdown the ink film. You'll want to use the same device—or one that produces the same ink film thickness—each time you blend a given color. This is important, as different hand-proofers with variations in ink film thickness can result in varying color densities.

To make it easy to always know which device was used, incorporate

its description within special nomenclature for your ink blends. Each ink blend name should include as many variables involved in the production of color at press as possible, and the hand-proofer is one of those variables. I like to incorporate color name; press ID; press anilox ID and geometry; hand-held anilox ID and geometry; and substrate type. In our example, the blend names will be:

- ABCB, 123, 789, 800, 2.3, 360, 5.0, C1
- P185, 123, 542, 600, 3.0, 360, 5.0, C1

Where:

- ABCB = Custom color name
- 123 = Press number or ID
- 789 = Anilox ID or serial number
- 800 = Anilox line count, press
- 2.3 = Anilox volume (BCM), press
- 360 = Anilox line-count, hand-proofer
- 5.0 = Anilox volume, hand-proofer
- C1 = "Coated 1-side" substrate

And:

- P185 = PANTONE 185 Red.
 - 123 = Press number or ID
 - 542 = Anilox ID or serial number
 - 600 = Anilox line count, press
 - 3.0 = Anilox volume (BCM), press
 - 360 = Anilox line count, hand-proofer
 - 5.0 = Volume, hand-proofer
 - C1 = "Coated 1 Side" substrate
- The names above look cumbersome, but they serve a valuable function in accurate color reproduction. They communicate to the press operator and ink blender important variables that influence color. These folks will have some idea of what to expect, should there be a change in any of the variables.

For example, if one of the press-related variables above changes the next time you print this color, you will likely need to modify your formula to

