

Printing Across Borders

Promoting one common initiative that will work back through accredited standards bodies and result in a true international commercial printing standard.

BY LARRY WARTER

The effort to develop a commercial printing standard that actually affects image reproduction has historically been stymied by the way printers have viewed themselves. After all, commercial printers traditionally thought of themselves as custom craftsmen and standards were a threat to their ability to create.

They were usually amenable to best practices, quality control tools and anything that gave them better control over their process; but their printing was a custom contract between their customers and themselves, and they made their money by being unique. Even the ISO 12647-2, *Graphic technology- process control for the production of halftone colour separations, proof and production prints-Part 2: Offset lithographic processes*, developed in 1996 and the U.S.-based GRACoL Guidelines, introduced a year later, were not intended to govern images. They were both summaries of best practices and customs that were intended as references for printers and, more important, to enable their customers to be able to judge the quality of their printing using accepted printing goals and tolerances for density (for CIELAB values in Europe) and dot gain (now tone value increase).

These two sets of goals are different because they were established to reflect separate local practices and measuring procedures; and, at that time, there seemed no reason to force them together. As a footnote, they actually turned out to be very close to each other probably due to similar market requirements.

Implementing Color Management

It wasn't until just over five years later that, based on improvements in the ICC Specification and development of graphic arts oriented versions of PDF like PDF/X, the commercial printing market was given

the option to actually start using color management to improve their printing. Initiatives were begun by ECI, the European Colour Initiative, and GRACoL, in the United States, to develop standardized reference printing conditions for commercial printing. These were still separate initiatives because it was assumed by everyone that they would still follow local practices, which were based on positive plates in Europe and negative plates in the United States.

One of the problems that was experienced by both sides was the NIH factor (not invented here). Each attempt at printing a commercial standard, even though they were printed to the Lab aims in 12647-2 or the density aims in GRACoL, was a custom job because the idiosyncrasies of the chosen press produced a unique visual result. Commercial printers, with their history of custom craftsmanship, were not enthusiastic about printing to match someone else's custom job, especially since none of the efforts was good enough that it was beyond criticism. Printers endorsed the standardizing effort but found the results lacking, and there was no overarching driving force to move the process forward.

Working Toward a United Effort

Then along came CTP! While this was initially viewed by both sides as just a continuation of the respective printing tradition (sharp printing due to positive plates in Europe or fuller due to negative plates in the United States), printers soon started to migrate toward "linear" output for a multitude of reasons. Both sides were moving together and the stage was now set for a united effort.

For the past year, representatives from GRACoL and ECI have been informally meeting to compare results. In the last meeting at Print 05 in Chicago,



they were joined by printers or their representatives from eight to ten countries in Central and South America and Asia. After some discussion there remained some differences due to local legacy conditions, but there were many more similarities with all sides agreeing that a universal standard for commercial printing will have much more driving force than separate initiatives. The whole is greater than the sum of its parts, and, as noted, printers can criticize any local initiative as inadequate; but, if the standard represents the best efforts of standards bodies around the world, it will be a lot more difficult to ignore.

This initiative has been dubbed the Printing Across Borders Group, and its role is to facilitate an international printing standard. This does not in any way conflict with all the previous efforts. It is part of the normal standards process, because accredited standards bodies like ISO and ANSI/CGATS prohibit their committees from publicizing and testing their standards in order to ensure that the process is an open process. Other groups, like ECI and GRACoL must be formed to fill these needs and that has already been done. All that is now happening is that these two organizations and others like them around the world are banding together to promote one common initiative that will work back through the accredited standards

bodies and result in a true international commercial printing standard. The time is right!

Comparing the ECI and GRACoL initiatives, they are different but not incompatible. GRACoL, as has been noted in previous *IPA Bulletin* articles, is concentrating on changing the printing process to have a greater emphasis on gray balance and highlight contrast control in order to be able to give more visual consistency on press when printing color managed files. ECI has concentrated on refining the referenced printing condition so it is more generally representative of quality commercial printing. It is believed by most members of the Printing Across Borders Group that a meld of these two approaches would benefit both sides and commercial printing in general.

In fact, as Olaf Druemmer, a leader of ECI and the IPA Tech Conference Planning group, observed at the last meeting, the only two real differences are: whether gray balance should be emphasized more than tone value increase (if they are in conflict when coming to color on a given job), and is a fixed highlight to midtone contrast a viable goal to build into the reproduction process. Neither of these affects the choice of referenced printing condition, only the use. In fact, the reference printing condition that has evolved out of the GRACoL efforts very closely resem-

Printing Across Borders Questions

Formulate your answers to these questions before reading the GRACoL perspective.

- 1) What do you adjust, and in what order, to get proper color on press?
- 2) What do density and dot gain/TVI numbers mean?
- 3) Do you measure your jobs coated or uncoated, wet or dry?
- 4) How important is gray balance?
- 5) What is gray in terms of input CMY dot values?
- 6) Should this match the black 50%, the hue of the paper or absolute numeric $a^* b^*$?
- 7) What are your color tolerances apart from your consistency tolerances?
- 8) What products give the best reproduction (pos. or neg. plates, paper grades, coating) or are they all equal as long as they are consistent?
- 9) Do you use an intentional positively or negatively bowed curve to reflect legacy values?
- 10) How do you make sure that your midtone weight is appropriate?
- 11) Is midtone weight image dependant, and, if so, should adjustments be made in prepress or on press?
- 12) How does dot gain reflect this proper midtone weight?
- 13) What determines your target densities (cost of materials, paper and ink limits, standards, etc.)?
- 14) What should a standard represent in the commercial printing market?
 - ___ Lowest common denominator (minimum quality guarantee);
 - ___ A challenging but generally doable quality (quality practice);
 - ___ It should define the most ink that can be put on paper with reasonable cost and reproducibility (ultimate quality target).
- 15) Where does/should color management fit into this whole process?

bles the latest ECI printings, and there would be only slight modifications needed to fully incorporate the above two changes into their reference. GRACoL is closer to ECI now than previous GRACoL and ECI printing were to each other.

Understanding the Printers' Preferences

With that in mind, the various PAB countries agreed to canvass their printers for their inherent preferences about various aspects of these questions. In the box above is a series of 15 questions, specific and general, that need to be resolved by everyone who wants to be a part of the Printing Across Borders initiative. These, or questions like them, will be asked of printers

around the world, giving the Printing Across Borders Group direction on how to proceed. It is suggested that you read the questions in the box on the left and formulate answers to them for yourself. Once you have done that, continue with this article and I will provide answers from the GRACoL perspective. Compare the two and give us feedback as to whether you support or disagree with the conclusions.

GRACoL Responds to Questions

1) What do you adjust, and in what order, to get proper color on press? GRACoL believes that even printers who are printing to the numbers usually need to “tweak” the press at the end of makeready to get visual results. In some markets, like publications, this is not always possible, but that doesn't mean that printers wouldn't want to adjust the press to get a better visual match if they could. What are they adjusting? In some form, they are adjusting the weight or color of the image and that is most easily represented by adjusting the gray balance and weight of the midtone. All GRACoL is trying to do is make that midtone predictable so the image reproduction can be adjusted in prepress and the resulting reproduction on press will be visually predictable. Since this is the last adjustment that a printer generally makes, it is the most important because it, by definition, supersedes all others.

2) What do density and dot gain/TVI numbers mean? GRACoL believes these are process control tools for the press. They tell the printer that printing is consistent on that particular press, but there is no direct correlation between these numbers and the resultant color or image reproduction due to the many other variables on a printing press. Consistent density and TVI is necessary but not sufficient for predictable visual control of printing.

3) Do you measure your jobs coated or uncoated, wet or dry? GRACoL believes that most commercial printers measure their jobs both wet (while they are printing) and coated (after the job is finished). One of the problems with the previous reference printing condition DTR 004 is that its goal was dry uncoated, which was not useful to most commercial printers. While there are many problems with coated goals, as evidenced by the GATF coating report, they represent the most common form of high-end commercial printing and should be the basis for future standards. We also will try to incorporate representative examples of dry uncoated numbers for reference.

4) How important is gray balance? GRACoL believes that, in matching two images, the printers would ideally like to measure every color in the image and compare the colors one by one. That is not possible and, even if it were, they would not be prioritized or necessarily uniform in how they would vary with press adjustments. A group of representative colors would help and the FOGRA Media Wedge works well but is hard to incorporate in jobs with limited space. Overall, the midtone gray patch and hopefully a full range gray balance curve holds the most hope of easily representing the full image when making judgments. It has the added advantage of giving direct guidance to the pressman. (If the patch is too red, he knows he has to decrease the magenta and yellow, etc.)

5) What is gray in terms of input CMY dot values? GRACoL follows the ISO 12647-2 standard that defines midtone gray as 50 percent cyan, 40 percent yellow and 40 percent magenta.

6) Should this match the black 50 percent, the hue of the paper, or absolute numeric a* and b*? GRACoL has no large preference for any of these three options. We have chosen to match an absolute numeric CIELAB number because matching the black 50 percent will cause variations if the black ink varies in color. The same is true for the hue of the paper since commercial printing papers vary in hue as much as 10 delta E from each other.

We had originally selected $a^*=0$, $b^*=0$ as the target, but Phil Green of ICC pointed out that the eye is influenced by the hue of the paper and apparent neutral is one third the distance from absolute neutral to the paper hue. Since paper hues in the United States generally range around a b^* of -6, we have chosen neutral to be $a^*=0$, $b^*=-2$, but we are more than willing to adjust that goal to whatever is most widely acceptable.

7) What are your color tolerances apart from your consistency tolerances? GRACoL believes that density (including colorimetric density) and dot gain/TVI are process control tolerances and do not reflect image color. The closest we can come to judging image color is average delta E or some permutation of it, but that requires that an IT8.7/3 or similar target be included with every job, and, even if it were, evidence, as documented by CGATS, is that it would not predict visual match. Since there is no certain method to measure and predict visual match at present, GRACoL believes visual consis-

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tency is the best alternative, and this is accomplished by pinning the middle tones of the image and letting the ends move because statistically there should be less visual variation. Our process is to adjust the press until the midtone neutral patch measures an exact Lab number, make sure that the solids are within the proper range and check the dot gains to warn the printer when the process is becoming unstable. If done in that priority not necessarily that sequence, it should facilitate full color visual consistency. Put another way, we are measuring the color generated by the ink layer interactions not the implied combination of four layers treated as though they were separate.

8) What products give the best reproduction (positive or negative plates, paper grades, coating) or are they all equal as long as they are consistent? GRACoL believes that markets choose paper, inks and plates/blanks/etc., based on the value proposition of their marketplace. Any combination of these can and should be optimized, and the path to optimization will be the same, independent of the components.

9) Do you use an intentional positively or negatively bowed curve to reflect legacy values? GRACoL believes there are so many variables in printing that no single aspect should take precedence over the combined effect. It is better to obtain the best reproduction going forward than to repeat old customs if they have been found to be less than adequate. That is apparently the path most printers are taking and GRACoL supports them.

10) How do you make sure your midtone weight is appropriate? GRACoL believes one of the major problems with commercial printers in recent times is their desire to print sharp since dot gain is viewed as a problem. This has often caused images to be weak or washed out in midtone weight. The GRACoL process allows printers to measure and print to any dot gain numbers they desire as long as they are consistent. By building in a constant highlight to midtone contrast via the CTP unit, the midtone weight will be maintained and the reproduction will match the proof as OK'd by the customer.

11) Is midtone weight image dependant, and, if so, should adjustments be made in prepress or on press? GRACoL believes midtone weight is image dependant. By holding the press consistent for midtone weight, this allows prepress to optimize each image and expect good reproduction on press.

12) How does dot gain reflect this proper midtone

weight? As already noted, GRACoL believes the printer can strive for any targeted dot gain, and the process can be adapted to give the proper midtone weight since CTP has divorced the absolute relationship between the two.

13) What determines your target densities (cost of materials, paper and ink limits, standards, etc.)? GRACoL believes that for high-end commercial printing, printers should be able to print with as much ink as they can reliably transfer to paper, realizing that ink transparency will usually limit the gain in image enhancement at a point not too far beyond the GRACoL goal densities. This was reconfirmed during the GRACoL printing trials when higher densities were tried. The GRACoL process allows printers to experiment with higher densities while maintaining basic image reproduction due to the fixed highlight to midtone contrast range.

14) What should a standard represent in the commercial printing market? GRACoL believes the GRACoL standard should represent the ultimate quality target for commercial printing. It should define the most ink that can be put on paper with reasonable cost and reproducibility. Printers should not sell their value by how unique they are but rather by being the only ones who can reproduce the GRACoL midtone requirements while meeting or exceeding the GRACoL density aims. Our experience has shown that this is not a trivial exercise.

15) Where does/should color management fit into this whole process? The GRACoL process is not the ultimate answer. It is simply a method for optimizing the press to print color managed files. It stabilizes only neutrals and near neutrals. All other colors will have to be optimized through color management; but at least, when they are, the press will be ready to reproduce them.

Defining the Future

Now is the time for a universal commercial printing standard. The nexus of color management and computer-to-plate with traditional commercial printing goals, as documented in GRACoL or ISO 12647-2, gives us the opportunity to define the future. By simply reprioritizing our on-press measurement goals from density>dot gain>gray balance to gray balance>density>dot gain we can change the press to primarily a color-managed output process instead of the tail that is wagged by the visual proofing dog. And, haven't printers wanted all along to bring the press back to the center of the process? 