

Analysis



Business Development Services



June 2016

PRISMAsync and G7®: Practical Color Management

Published For:



InfoTrends

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Key Highlights

- More and more print service providers (PSPs) are realizing that they need to manage color across devices and remotely located production facilities. G7® is widely viewed as a practical and valuable metric for obtaining print conformance.
- G7 innovates gray management through the introduction of colorimetric targets for lightness, contrast, and balance, manageable using simple tone curve controls.
- The G7 calibration and embedded profiling features of the PRISMAsync color print server can enable G7 compliance to be achieved in a short time.
- The G7 capabilities of PRISMAsync can integrate into PSPs' existing G7 and color management workflows through import support for many third-party G7 curves and ICC profiles.

Introduction

Managing color in a print production workflow is a multi-step, continuous process with many variables. Historically, print providers have struggled with implementing color management effectively into their workflows. This challenge has only intensified as more print service providers (PSPs) are managing complex production environments with multiple printing technologies. Additionally, there are more print providers that need to manage color over production facilities in multiple locations— maintaining consistent, repeatable color. Technological advancements are simplifying the traditional color management process, enabling time/cost savings and centralized management. One of the primary benefits of the G7 specification is that it is device-independent, meaning that a print service provider can leverage all the benefits of the specification across a range of digital and conventional printing technologies. With the Idealliance Certified G7 System Calibration feature of PRISMAsync, since version 4.1 or later, a G7 calibration can be performed within minutes directly at the operator control panel of the Canon imagePRESS.

The Importance of Color

Color is particularly important to businesses and their brands. According to a Management Decision magazine article entitled “Impact of Color on Marketing,” people form their initial conclusions about a product within 90 seconds, and 62%-90% of that decision is based solely upon color.¹ For marketers, a positive experience with color can be synonymous with higher sales. Alternatively, a negative color association might result in loss of loyalty. For these reasons, color accuracy and consistency in printed materials becomes critical when purchasing print communications.

Given its inherent variability, color printing can be a struggle for PSPs. From a production standpoint, there are a myriad of variables that must be considered, including substrate, ink/toner, and the process by which the piece is printed. Other factors are at play too, including an individual’s ability to see color or the conditions in which the color is seen. Managing color is challenging given the complexity of these processes.

What is G7?

G7 is a method and calibration technique from Idealliance. It is based on ISO 10128 standard to balance cyan, magenta, and yellow so they appear as a neutral gray regardless of the color imaging process/device. Launched in 2006 and originally developed for halftone laminate proofing systems, G7 has since been applied to many other printing processes, including offset lithography and digital electrophotographic printing.

The G7 calibration process uses software to create simple one-dimensional curves that adjust the raw device output to a gray balanced state called G7 Grayscale, which can be used as a process control baseline. When combined with color management, G7 Grayscale can help users achieve the higher compliance levels such as G7 Colorspace. PSPs that implement the G7 method can expect the following benefits:

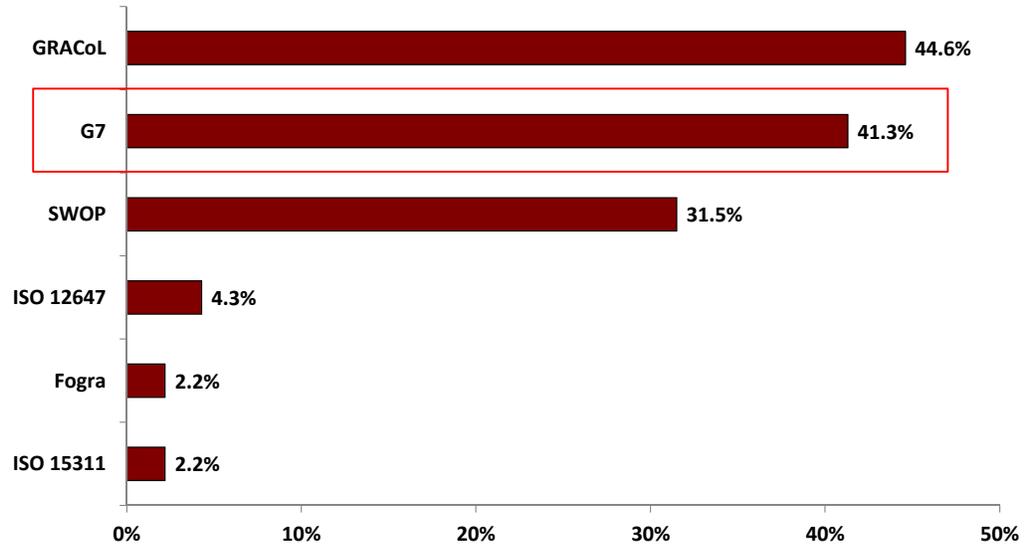
- G7 can be used as a “best practice” method for measuring and tracking print quality over time. This can lead to quality improvements and waste reduction.
- All printing systems following the G7 process have a “shared neutral appearance,” meaning that files prepared for any G7 may enjoy greater flexibility across devices and papers at output.
- G7 is recognized as a quality standard within and outside of the printing industry that PSPs can leverage when marketing their businesses and products.
- G7 offers value for print buyers and brand owners in terms of color predictability, fast make-ready, and color approvals.

G7 = Gray + 7
G7 stands for grayscale from seven ink solids: the subtractive primary colors (Cyan, Magenta, Yellow, and Black) and the secondary overprints (Red, Green, and Blue).

¹ Satyendra Singh (2006), “Impact of Color on Marketing,” Management Decision, Vol. 44 Iss. 6, pp 783-789.

For these reasons and more, G7 is a popular method for managing color. In fact, InfoTrends' 2015 survey entitled *Emerging Trends in Color Management* revealed that 41% of printers have implemented G7 as a standard.

Figure 1: Which of the following color standards, specifications, or methods have you implemented?



N = 92 Respondents

Source: *Emerging Trends in Color Management*, InfoTrends 2015

G7 ≠ GRACoL

General Requirements for Applications in Commercial Offset Lithography (GRACoL®) and G7 are often mistaken for one another, but they are not the same. GRACoL is a color reproduction specification for sheetfed offset lithography created on a G7 greyscale calibration condition but requiring close color matching to ISO defined ink and paper colors. G7 greyscale alone does not require a match to special ink colors or paper, so meeting the GRACoL specification says more about overall colorimetric accuracy. Thus a printing system can be in G7 Greyscale conformance without meeting the GRACoL specification.

Ease into G7 with Multiple Levels of G7 Compliance

As illustrated in the Figure below, there are three levels of compliance for G7. Each level of compliance builds upon the foundation of the previous, thus making it easier for printers to get started and incrementally build their color quality initiatives.

Figure 2: G7 Compliance Levels

	Gray Balance	Tonality	Common Visual Appearance	Overprints	Entire Colorspace
Gray Close match, but may exhibit differences in saturated colors	X	X	X		
Targeted Close match, but may have some differences in various colors	X	X	X	X	
Colorspace Close match across common colorspace	X	X	X	X	X

G7 compliance levels build upon a foundation of gray balance, tonal contrast, and common visual appearance called G7 Grayscale, achievable using simple one-dimensional calibration curves. When solid CMYK and overprint RGB colors also show a good match to a targeted reference print condition (e.g., SWOP or GRACoL), the system can then achieve the higher G7 compliance level called G7 Targeted.

When the average of all the color patches in a targeted reference print condition and the 95th percentile of colors also show a good match, the system can then achieve the highest G7 compliance level, which is called G7 Colorspace. G7 Targeted and G7 Colorspace may require the addition of color management with G7 calibration software to achieve these higher levels of compliance.

PRISMAsync: G7 on Your Terms

PRISMAsync is a color print server used to drive Canon imagePRESS digital production color presses. PRISMAsync versions 4.1 and later have included Idealliance Certified G7 system to offer new and experienced users two efficient pathways toward G7 compliance: G7 embedded workflow and G7 external integration. The new features, called PRISMAsync G7 calibration and Embedded Profiler, added to an Advanced Color Management feature set, combine two very useful functions —G7 grayscale calibration and color profile creation for the Canon digital press. Since Canon develops the print engine and the PRISMAsync color print server, both steps can be accomplished efficiently. Existing PRISMAsync users can upgrade to the Advanced Color Management feature set to enable the new capabilities.

PSPs that are just starting out and want to meet the G7 Grayscale compliance level can follow a simple procedure after creating the media family and corresponding media at the digital front end. The press operator generally takes 5-10 minutes to print 8 targets and

PRISMAsync Media Family:

A capability in which paper with similar characteristics can share calibration resources to help improve media efficiency

measure the corresponding patches with a spectrophotometer. These measurements contain enough information to perform a grayscale calibration and also create a color profile. PRISMAsync stores a record (date and timestamp) of the last calibration date for future reference. When the paper and press conditions are sufficient to meet conformance requirements, the measurements taken using the internal G7 Calibration and Embedded Profiler can be used to deliver G7 Colorspace conformance.

PSPs that are well-versed in color management techniques and have implemented G7 workflows can benefit from the flexibility of the system. Calibration curves from other Idealliance certified G7 tools and ICC profiles from third-party color management systems can be imported with a few clicks. Nevertheless, seasoned color management professionals may still choose to use PRISMAsync's built-in G7 features due to the convenience of having the operator perform the process directly at the digital front end. Users can still use the classic Canon calibration for applications that may still require it.

The Bottom Line: The Benefits of G7 Calibration

A primary driver for G7 grayscale calibration is repeatable output that is fast and easy to achieve. With the Idealliance Certified PRISMAsync G7 Calibration and Embedded Profiler solutions, PSPs can move their Canon production color press toward G7 conformance quickly. Furthermore, Canon's decision to implement support for external G7 workflows can help PSPs make changes quickly as technologies, processes, or standards evolve. This is an additional benefit to customers.

Printers can leverage Canon's qualified G7 Experts, regardless of whether they are performing complex implementations or just starting out. There is an inherent value-add for printers that can deliver quality and consistent output in a digital print environment, and the new Idealliance Certified G7 capabilities are an example of Canon's commitment to helping printers achieve these results.

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[Comments or Questions?](#)

This analysis was commissioned by Canon U.S.A to identify the key value-added benefits of implementing G7 workflows into production digital color press environments. As print service providers continue to expand their offerings, Canon U.S.A. is focused on supporting their efforts through a wide range of services and workflow solutions.

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