



TECHNICAL GUIDE • COLOR MANAGEMENT

Why It's Difficult to Match Pantone Colors in Digital Printing

A practical guide to gamut, ICC profiles, and process control
for textile decorators who handle color approval every day.

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INTRODUCTION

Pantone Color as a Reference, Not a Guarantee

In digital printing, the final color depends on the equipment, the fabric, the inks, and the workflow. The goal is to approximate with control and consistency, not to reproduce the spot color exactly.

This guide was built for anyone who deals with color approval on a daily basis: production managers, pre-press operators, and sales teams who need to explain, with technical clarity, why a Pantone color doesn't always come out exactly as it looks on the swatch.

We cover the core problem, the factors that influence the result, the recommended process for approximating a color with rigor, and the role tools like Photoshop and NeoStampa play in that process.

The same file can produce different results if a single process variable changes — fabric, ink, profile, or evaluation lighting. That's why color consistency requires process, not just good intentions.

The Core Problem

Pantone and digital printing were built on different color logics. Understanding that difference is the first step to managing client expectations.

Reference Color

Pantone is a reference color system, often thought of as a spot color — a fixed, pre-defined color.

Limited Gamut

Digital printing works within a color gamut limited by the inks and equipment used.

Out-of-Gamut Colors

Some Pantone colors fall outside that reproducible gamut and cannot be obtained exactly.

Approximation, Not Equality

As a result, the same reference can only be approximated, not matched exactly, even with the correct process.

IN PRACTICE

When a color falls outside the available gamut, it's the RIP or color management software that selects the best possible approximation within the color space the machine can produce.

Factors That Influence the Final Color

The printed result doesn't depend on the file alone. It depends on a set of process variables that interact with one another.

Fabric Type and Color

The fabric's composition and base tone directly affect how the printed color is perceived.

Underbase / White Base

The thickness and opacity of the underbase influence how the overlying colors behave.

Pre-treatment

Prepares the fabric surface to receive the ink and affects color fixation and saturation.

Ink and Printhead Condition

The maintenance condition of the printheads has a direct impact on color consistency.

ICC Profile and Linearization

Define how the file's colors are translated into the printer's actual color space.

Resolution and Print Mode

Change how the ink is deposited and, as a result, the final color density.

Evaluation Lighting

The light under which a sample is assessed directly influences color perception.

Washing, Curing, and Finishing

Post-print processes can slightly alter the final tone of the piece.

The same file can give different results if any of these variables change. That's why two seemingly identical production runs can come out with slightly different tones.

Best Practices for Approximating a Pantone Color

A five-step structured process reduces the variation between the target color and the printed result.

1

Define the Reference

Identify the Pantone color and the material it will be printed on.

2

Prepare the File

Work with consistent color management in Photoshop.

3

Use the Correct Profiles

Select the ICC profile suited to the fabric, ink, and production mode.

4

Test and Measure

Print samples and validate visually or with measurement, whenever possible.

5

Fine-tune in the RIP

Adjust color substitutions, curves, and profiles in NeoStampa.

Photoshop and NeoStampa: How They Help

Each tool plays a distinct role in the color management workflow, from file preparation to final machine output.

PHOTOSHOP

- Use the original file with correct color profiles
- Convert and prepare the artwork consistently
- Preview approximations before production
- Avoid random changes to saturation and contrast

NEOSTAMPA

- Apply specific ICC profiles
- Manage color substitutions and mapping
- Adjust output to fabric and ink type
- Repeat stable conditions to gain consistency

PROCESS NOTE

Photoshop controls file preparation. NeoStampa controls the translation of that color to the machine. Consistency depends on both stages working from the same profiles and criteria.

What to Tell the Client

The way you communicate the difference between a reference color and a printed color protects the client relationship and avoids unrealistic expectations.

KEY MESSAGE

In digital printing, Pantone colors are a reference, not an absolute guarantee. The result depends on the available color gamut and the actual production conditions. The right approach is to validate samples, control the process, and approve the best possible approximation.

Without the correct profile, without testing, and without process control, there is no consistent color precision. This is the foundation of any honest conversation about color approval, and the starting point for a more predictable production process.

ROQ Technology

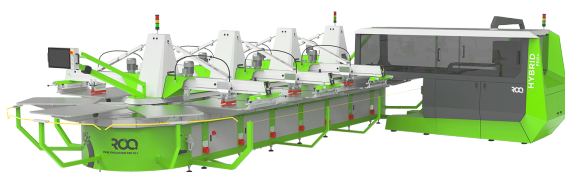
These color management principles apply to any digital textile production workflow, including the ROQ NOW and ROQ HYBRID PRO+ solutions.



DIGITAL PRINTING

ROQ NOW

ROQ's 100% digital solution, built for direct-to-fabric production workflows. Color management through ICC profiles and repeatable, stable production conditions are what guarantee consistency between pieces, day after day.



HYBRID PRINTING

ROQ HYBRID PRO+

ROQ's latest hybrid solution, combining automatic screen printing with digital DTF printing on the same line. In these mixed workflows, aligning profiles and approval criteria between the two techniques is what ensures color stays consistent throughout production.



YOUR PARTNER IN PRINT

Need Support Managing Color in Your Production?

The ROQ team supports textile decorators with ICC profile setup, workflow calibration, and process optimization, from file to finished piece.

Talk to Our Team