

Precision Color Calibration Technology

Overview of Precision Color calibration technology

Calibration ensures that a proofer consistently prints the same color. Precision Color is a new calibration technology for Kodak® Matchprint® inkjet proofers in Kodak Proofing Software version 4.0 and later.

The Precision Color Calibration wizard guides you through the process of calibrating a Matchprint inkjet proofer for a specific media configuration. A media configuration controls how much ink prints on the media. (More information about media configuration files is provided later in this bulletin.) For each step, the Precision Color Calibration wizard guides you to print and measure a chart.

The first step in the Precision Color Calibration wizard is the Initial Check Step, and it identifies how the proofer currently prints. When measurement is complete for the Initial Check Step, the Precision Color Calibration wizard compares the measurements of the calibration patches in the chart to the baseline target numbers stored in the media configuration, and evaluates the difference. The Precision Color Calibration wizard presents you with the results, which include a summary of the average and maximum measurements for the chart compared to the average and maximum tolerances defined for the media configuration. In other words, you can view how close the measurements are to the baseline target numbers. See Figure 1.

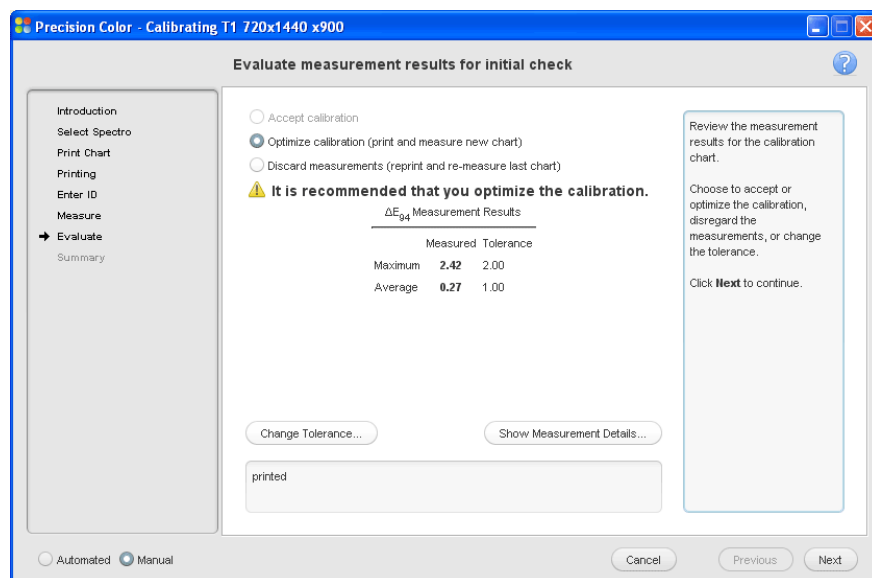


Figure 1: Measurement results and recommendation for the Initial Check Step

The second step in the Precision Color Calibration wizard is called Optimization Step 1. It uses the measurement results from the Initial Check Step to adjust how the proofer prints for the media configuration. When measurement is complete for Optimization Step 1, the Precision Color Calibration wizard presents you with the results, and you can view how much closer the measurements are to the baseline target numbers. See Figure 2. You can also view details about the measurements if desired. See Figure 3.

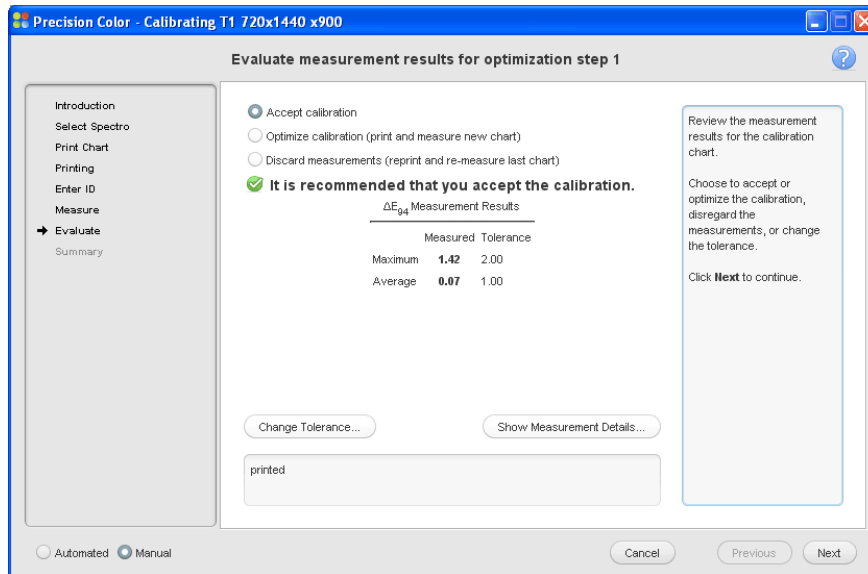


Figure 2: Measurement results and recommendation for the Optimization Step 1

If the average and maximum measurement numbers are less than the average and maximum tolerance numbers defined in the media configuration, you can accept the calibration, and the proofer is ready to print calibrated proofs on the media. Otherwise, you can choose to perform another Optimization Step to bring the proofer closer to the baseline target numbers. The Precision Color Calibration wizard recommends whether you should accept the calibration or optimize the calibration to help you determine how to proceed.

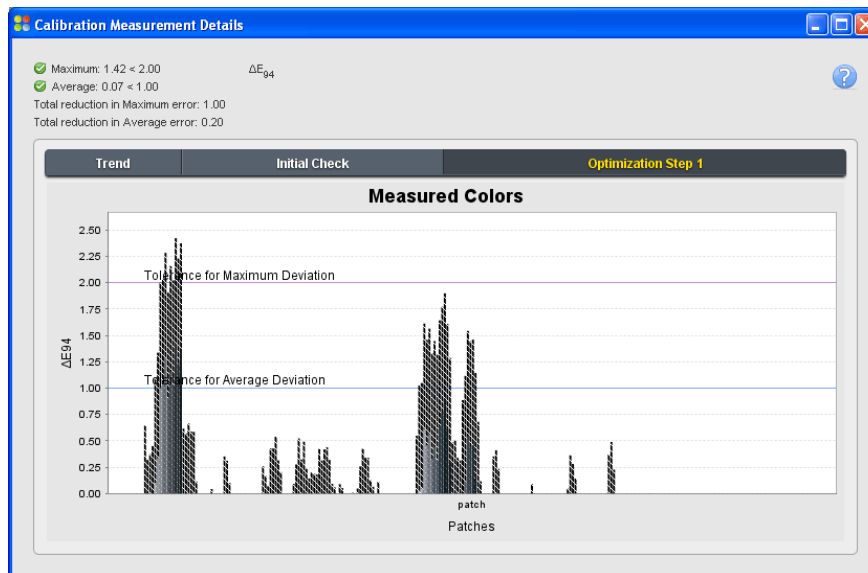


Figure 3: Optimization Step 1 tab on the Calibration Measurement Details window

Optimizing the calibration

The Precision Color Calibration wizard lets you choose whether to optimize the calibration to bring the proofer closer to the baseline target numbers stored in the media configuration. Each Optimization Step prints and measures a chart to collect information about how the inkjet proofer prints in relation to the baseline target numbers. After the Initial Check Step and each Optimization Step, the Precision Color Calibration wizard analyzes the measurement numbers and adjusts how the proofer prints as necessary. Subsequent Optimization Steps include the adjustment from the previous Optimization Step to bring the proofer closer to the baseline target numbers. The measurement results are presented for you to review, and you can accept the calibration, or you can proceed with another Optimization Step.

You can perform multiple Optimization Steps for the calibration until the proofer prints as close as is possible to the baseline target numbers. However, consider proofer and spectrophotometer variance when you calibrate the proofer close to the baseline target numbers. You want the proofer to print within a close range of the baseline target numbers, and you want the range to be wide enough to accommodate any proofer and spectrophotometer variance. Slight variance in proofer and spectrophotometer performance is normal and cannot be eliminated. It's not recommended to optimize the maximum, measured number below 1 ΔE .

The Precision Color Calibration wizard is designed to minimize variance by printing the same charts in the same location every time that you use the Precision Color Calibration wizard to calibrate the proofer. This process is consistent and provides the best opportunity to print and measure the same color each time.

Accepting the calibration

Once measurements are within the tolerance for the media configuration, the Precision Color Calibration wizard recommends whether to continue with another Optimization Step, or whether to accept the calibration. The Precision Color Calibration wizard uses the difference between the latest measurements and the baseline target numbers with the settings in the media configuration to make its recommendation. You can edit the settings in the Media Configuration Editor if desired.

In the Media Configuration Editor, you can change the average and maximum tolerance numbers for the media configuration. (You can change the tolerance numbers in the Precision Color Calibration wizard, too.) You can also specify how much effort the Precision Color Calibration wizard should expend on optimizing the calibration. For example, you can specify a maximum number of Optimization Steps, or you can let the Precision Color Calibration wizard identify when no further improvement is likely. The Precision Color Calibration wizard uses this information with the measurement results to recommend when you should accept the calibration and when you should perform another Optimization Step. For Epson® Stylus Pro x900 proofers with inline spectrophotometers, you can also set up and schedule automatic calibration if desired.

First calibration of media benefits from two or more Optimization Steps

The first time that you use the Precision Color Calibration wizard to calibrate an inkjet proofer for a media configuration, complete the Initial Check Step plus Optimization Step 1, Optimization Step 2, and maybe Optimization Step 3. The extra works gives the Precision Color Calibration wizard enough information to bring the proofer close to the baseline target numbers for a specific media configuration. The Precision Color Calibration wizard saves this information, and all subsequent calibrations of the inkjet proofer, and will likely only need the Initial Check Step and possibly Optimization Step 1 to return the inkjet proofer to its calibrated state.

Kodak media configurations and Precision Color calibration technology

Kodak media configurations characterize proofing media and define the target and tolerance numbers used to calibrate the proofer for the media. As a result, Kodak media configurations control how the proofer prints ink on media. Kodak tests and evaluates how Kodak media perform on Kodak inkjet proofers, and uses the test results to create media configurations that control ink volume, offer optimal gray balance, help ensure linear output of CMYK inks, and control the available color gamut of the media.

The Precision Color Calibration wizard uses the target and tolerance numbers in the media configuration when you run the wizard. The Precision Color Calibration wizard calibrates the proofer for the media configuration until the measurements of the patches in the chart are less than the tolerance numbers defined for the baseline target numbers in the media configuration, and you accept the calibration. The Precision Color Calibration wizard saves the calibration information with the media configuration for future use.

The next time that you use the Precision Color Calibration wizard to calibrate the proofer for the media configuration, the Precision Color Calibration wizard starts with the information from the last calibration and

works with you to keep the proofer calibrated. In other words, the Precision Color Calibration wizard stores information specific to how the proofer prints and uses this information to keep the proofer calibrated within the tolerance numbers specified for the media configuration.

Benefits of the Precision Color Calibration Technology

You control the level of calibration accuracy

You can control how accurate you want the Precision Color calibration process to be. You control the process by deciding how close you want the proofer to print to the baseline target numbers before accepting the calibration. You can also choose to change the tolerance number for the media configuration.

Enables closer alignment between two or more proofers

When a proofer is calibrated close to the baseline target numbers, it prints within a tight range. As a result, the color has less room to shift. If you have two or more inkjet proofers in your shop, and you use the Precision Color Calibration wizard to calibrate both proofers close to the same baseline target numbers, you will see little difference between how the proofers print, and you can better control color in your shop. Remember to calibrate the proofers every seven days to maintain consistency.

Better Gray Balance

Because the Precision Color Calibration wizard identifies how each proofer prints on the media, it has enough information to correct how the proofer prints gray. Each step in the Precision Color Calibration wizard gathers enough information around the neutral axis in the color space to ensure excellent gray balance after calibration.

Equal or better measurement results always used

The Precision Color Calibration wizard analyzes the measurement results, factors in any noise presented by the inkjet proofer or the spectrophotometer, and presents the best path forward. The Precision Color Calibration wizard discards any corrections that do not maintain or improve calibration. As a result, each Optimization Step maintains or improves the calibration. Sometimes the best path forward is to accept the same measurement results as the last Optimization Step. However, you are never presented with worse measurement results.

Automated spectrophotometers speed up the calibration process

The charts used for the Precision Color Calibration wizard contain a large number of patches. An automated spectrophotometer will make measurement of the patches faster and easier. An inline spectrophotometer is the best solution when available. You can also use an automated X-Rite® i1® iO. For example, if you currently use a X-Rite Eye-One spectrophotometer, you can purchase the i1iO Automated Scanning Table for the spectrophotometer, and the duo becomes the automated i1iO. Contact your sales person for more information

(part number 015-00091C-71). The following table identifies the recommended spectrophotometers for different proofer models and Precision Color.

Proofer	Recommended Spectrophotometer for Calibration
Epson Stylus Pro 7900 and 9900 proofer HP Designjet®	Use the inline spectrophotometer to get the best results. Kodak uses the inline spectrophotometer to create media configurations for these proofers, and you will get the best results when printing color bars for various industry standard organizations.
Epson Stylus Pro x600, X800, and X880 proofers	Use an offline, automated X-Rite i1iO or Gretag Macbeth Spectrolino SpectroScan spectrophotometer to automatically measure the many patches. Kodak uses these spectrophotometers to create some media configurations for these proofers. In addition, the Precision Color Calibration wizard instructs you to mount the chart and set up the offline spectrophotometer, and then to leave the proofer to measure the chart. The Precision Color Calibration wizard automatically starts the measurement process when the wait time for the ink to dry expires.

Tighter color control for the Certified Process for Color Confirmation

Because Precision Color calibration technology lets you calibrate proofers closer to the baseline target numbers, it can improve how a proofer prints color compared to the existing ColorZone calibration technology. When you use the Precision Color Calibration wizard to calibrate a proofer, you should also set up the target values for your default and user-defined color bars. For default and user-defined color bars, target values can be established when you measure a color bar for the first time. The measurements of the color bar are stored as target values against which all further uses of the color bar are measured.

It is best practice to identify the target values for your color bar immediately after you calibrate the proofer. Should you switch a media configuration from ColorZone calibration technology to Precision Color calibration technology, it is likely that the proofer will print closer to the baseline target numbers, and it is recommended that you recapture the target values for your color bars. Another time to recapture target values is when you calibrate the proofer closer to the baseline target numbers, and you notice that color bar measurements have shifted beyond what you expect for your standards. When you don't recapture target values for the color bars, measurements may show that the color bar has drifted away from its target values.

Self-test to view the benefits of Precision Color calibration technology

This section describes how you can run a test at your print shop to see the benefits of Precision Color technology.

1. Identify two proofers of the same model, and load the same media on each.
2. Use the ColorZone Calibration wizard to calibrate both proofers.
3. For one proofer, use the Kodak Proofing Software to create a default color bar and capture its target values.
4. In the Kodak Proofing Software, create a layout with Certified Process for Color Confirmation enabled and the default color bar selected to print at the bottom of the sheet.
5. Print the default color bar below an 8.5 x 11-inch job on both proofers, and measure the color bars.
6. Generate the report for the Certified Process for Color Confirmation to view the measurement results for the color bar printed on the second proofer (that is, the proofer on which you didn't capture the target values).
7. Use the Precision Color Calibration wizard to calibrate both proofers.
8. For one proofer, use Kodak Proofing Software to create a second default color bar and capture its target values.
9. Print the default color bar below an 8.5 x 11-inch job on both proofers, and measure the color bars.
10. Generate the report for the Certified Process for Color Confirmation to view the measurement results for the color bar printed on the second proofer (that is, the proofer on which you didn't capture the target values).
11. Compare the measurement results for the two color bars.

Be sure to use the same type of layout to place the color bar in the same position on the proof. Notice that the measurements are closer to the target numbers for the color bars printed on the proofers when calibrated with the Precision Color Calibration wizard.

Precision Color calibration enables you to get better results for the Certified Process for Color Confirmation because the proofer can print closer to the baseline target numbers, and you can set up multiple proofers to do the same.

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