



Linearization and Profiling of the HP Designjet Z series

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1 Used system configuration

This article relates to the following system configuration:

Software version:

EFI Colorproof XF 3.0 plus Service Pack 3

Miscellaneous:

The EFI Color Manager Option is needed for profiling purposes

2 HP Designjet Z series

2.1 General

HP presented a new printer series at the Photokina show in Germany. This printer series consists of two new printer models:

- HP Designjet Z2100 Photo
- HP Designjet Z3100 Photo

Whereas the printer models HP Designjet 30/130 used VIVERA dye inks, the new Z-series printers use VIVERA pigmented inks.

The HP Designjet Z2100 is an 8-color printer which is available in 24" up to 44". The 8 colors are cyan, magenta, yellow, light cyan, light magenta, light gray, matte black and photo black.

The HP Designjet Z3100 uses magenta, yellow, light cyan, light magenta, light gray, gray, matte black, photo black, red, green, blue plus a gloss enhancer.

A special feature of both printers is an embedded spectrophotometer.

2.2 Technical details relevant for printing and proofing

2.2.1 The embedded spectrophotometer

The embedded spectrophotometer is part of the Eye-One series from X-Rite. It is comparable in terms of used components and quality. It is worth mentioning that this measurement device uses a UV cut which has a big effect when measuring media with optical brighteners. In general, it is very important that the same type of measurement is used to measure both reference and proof, i.e. if the reference was measured without a UV cut, the proof should also be measured without a UV cut.

Notes for using ISOCoated as a reference: If you measure the printout against the ISOCoated reference, it will result in a greater deviance because the ISOCoated reference was measured without a UV cut.

2.2.2 The VIVERA inks

Both HP Designjet printer Z2100 and Z3100 use HP VIVERA pigmented inks. HP gives 300 years of fade resistancy. The Designjet Z3100 has the ability to print a gloss enhancer over the printout. The gloss enhancer is not a overall layer of glossy ink. It gets printed only in the areas where the ink is. The reason is to align an overall glossy effect. Because the ink has different reflection behaviour than the glossy paper, the printout would not look consistent. The gloss enhancer aligns the different reflection and creates a smooth printing image. It also reduces the bronzing effect which makes it applicable for black & white prints.

2.2.3 Preparing the printer for printing

Before the printer is used with EFI Colorproof XF, it is recommended that you make the following settings at the printer's control panel:

- Select the correct print medium
- Perform a printer calibration

In every EFI standard paper profile folder is a read me text file which has information about the used panel settings which was used during the profile creation.

2.3 Technical Information for EFI Colorproof XF

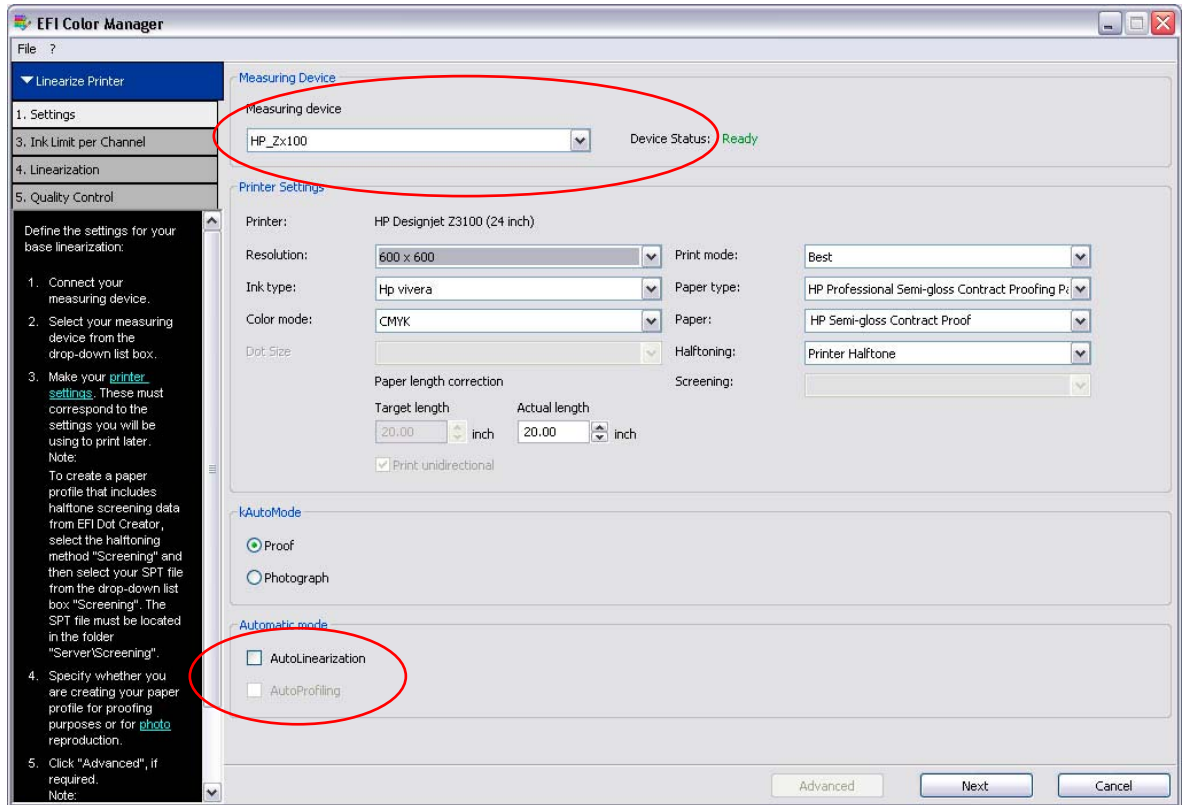
2.3.1 General implementation

The new HP Designjet Z series can be used not only as an ordinary printer in the output module but also as a measuring device in EFI Lintool/Color Manager and the EFI Color Verifier.

When selected in EFI Colorproof XF, the measurement of printed targets is automatically incorporated. It is not possible to insert a pre-printed chart into the printer and use the spectrophotometer as a measuring device.

2.3.2 Implementation in EFI Lintool/Color Manager

As the HP Designjet Z series has an embedded spectrophotometer, the printer can be selected as a normal measuring device.



As you can see in the screenshot, the step “Total Ink Limit” has been removed. This is because all tests have shown that a total ink limit of 400% is needed to achieve a good print quality. The printer will limit the ink internally.

The linearization process in EFI Lintool/Color Manager can be done in two different ways:

- Manually
- Automatically

In both cases users need to make the correct settings in the first screen.

Using the manual method, users must click “Print” to output the target and then click “Next” to go to the next screen. This means following the steps given in the RIP, although adjustments are possible in the “Advanced” windows.

With the automatic method, all the necessary steps are performed without user invention right up until the creation of an EPL file. On the first screen users can also choose if the

software should start the profiling process automatically after the EPL file has been created (see screenshot). In order to use the automatic method, the printer must be selected as the measurement device.

Both methods (manual and automatic) require the user to make the settings on the first screen and then click the “Print” button.

After the user has clicked “Print”, the target is printed and automatically sent to the printer. The printer outputs the target and waits approximately 5 minutes. This is the default drying time. It can be adjusted in EFI Colorproof XF by selecting the tab “Output device\Special”. Drying times up to 30 minutes are possible.

The status of the job will stay at “Processing” for the entire duration of the printing and measuring process. After the measuring process is completed, the status changes to “Printed” and the measured values are displayed in EFI Lintool/Color Manager.

Note: Please make sure that the option “Minimal paper consumption” is not selected, as this setting may cause the software to rotate the linearization or profiling charts. The internal measuring device is not able to detect the color patches if the charts are rotated.

2.3.3 Special settings in EFI Colorproof XF

Printer-specific features can be selected on the “Output device\Special” tab. The following settings are available for printers of the HP Designjet Z series:

- Activation of gloss enhancer
- Drying time (waiting time until measuring commences).

2.3.4 Using standard paper profiles

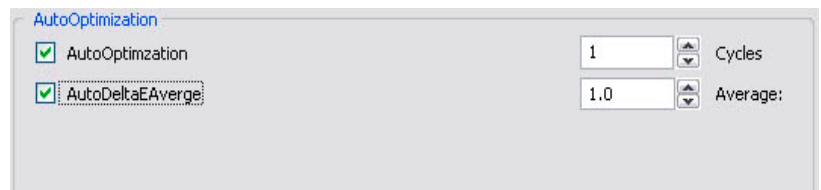
It is important that the correct print medium is also selected at the printer’s control panel. The setting must match that of the paper profile. You can find the required information in a text file which is located in the individual folders of each of the EFI paper profiles. A similar text file is also provided with paper profiles available for download from the online Profile Updater.

2.3.5 Implementation in the Optimizer

Optimization does not start automatically. However, here too, the embedded spectrophotometer can be used for measuring. The “Settings” window has two additional options:

- Auto Optimization
- Auto Delta E Average.

With “Auto Optimization”, the number of optimizations performed is defined by the number of cycles. Optimization only stops when the defined number of cycles has been completed. In addition, users can use the text box to define the desired delta E value the optimization should reach. In this case, optimization will cease once the defined delta E value has been achieved or if the optimization result deteriorates.



2.3.6 Implementation in EFI Color Verifier

EFI Color Verifier also supports the measurement device of the HP Designjet Z series. However, only jobs received directly from EFI Colorproof XF can be measured with the embedded device. It is not possible to feed a pre-printed chart into the printer.

Automatic verification and the use of the embedded measurement device will start if the user:

- Activates the check box “Use Color Verifier”
- Selects the control strip for the HP Designjet on the “Layout” tab.

When the job has been printed it is submitted automatically to EFI Color Verifier and appears in the “Joblist/Preview” area. When the user clicks on the job, the used reference profile is loaded automatically and displayed in the left table. Then the print is measured, after which the delta E value is displayed and the job is ready for submission back to the EFI Colorproof XF Client application.

Nestings can only be verified if one control strip is selected for the whole nesting. It is not possible to measure control strips for individual nested jobs.

The EFI Color Verifier in conjunction with the HP Z-Printer can also process custom made media wedges. Some print shops or agencies use their own media wedge for quality assurance purposes. EFI offers a service to create such custom media wedges. Please contact proofing-support@efi.com for more information.

Please note that the stand-alone version of EFI Color Verifier does not support this measuring method with HP Designjet Z series printers.

2.4 Closed loop calibration

All HP Designjet printers support what is known as “closed loop calibration”, whereby the printer outputs a simple calibration target consisting of primary color gradations. After printing, the chart is measured automatically after a certain period of time. Once the strips have been measured, the printer creates an internal calibration curve which is applied internally inside the printer. This calibration curve ensures that the printer behavior is kept at a reproducible level. The advantage of CLC is that it is independent of how the device is being used. It returns the printer to its profiled state without taking into account the used reference, the printing purpose (proof/production), the selected paper type or whether new ink cartridges have been installed. It is fast because only gradations need to be measured.

The diagram on the right shows how closed loop calibration is implemented. The RIP transmits CMYK data to the printer driver. The printer driver creates the necessary printer-specific separation and coordinates the linearization settings such as total ink amount. This separation results in the different norm ink and light ink channels. These ink channels are applied to the CLC calibration curve. The advantage of using the CLC curve is that the curve is independent of the color separation and already incorporates the specific characteristics of the paper/ink combination. After the curve has been applied to the data, the necessary halftoning is done and the video data can be sent to address the different nozzles.

