

## DOT CREATOR — SCREENED OUTPUT

Dot Creator is shipped as an add-on option and was first launched with EFI XF 2.6. This document provides information on how to output screened data and explains the difference between the two available screening methods.

### General

Dot Creator creates screening files for the output of contone data. Screening files can be used for both composite and for separated output.

#### Composite output

Composite output provides a more accurate simulation of printing technologies that use wide screen rulings.

During composite output, all colors (process colors and spot colors) are printed on one page. Colors are printed on top of each other according to a defined screen ruling. This method can be used, for example, to simulate silk-screen screening on conventional inkjet printers.

#### Separated output

Separated output can replace traditional image setter technologies that use wide screen rulings, e.g. in the silk-screen industry.

During separated output, each color channel is printed on a different page. All colors (process and spot colors) are reproduced in shades of gray. This method can be used to print on transparent dot film media using a standard inkjet printer.



See also the know-how guide article [Using EFI Dot film on Epson Stylus Pro 4000 and x600 series printers](#).

## Color management

During conventional inkjet proofing, the printer driver receives color information from the color management module (CMM) and outputs the print job using all the available printer inks.

However, for screened output, EFI XF sends color information for the four process colors only. Thus, it is not possible to output screening files of print jobs that have already been color managed. Colors, including spot colors, are reproduced from CMYK inks by printing ink dots next to or on top of each other.

**NOTE:** By default, all spot colors are screened using the screen ruling for black. However, you can change this later in Job Explorer, if required.

## Moiré prevention

One disadvantage of screened output is the danger of moiré. This can occur as a result of an unfavorable combination of print resolution and screen ruling. Screened printouts without moiré patterns are generally only possible with screen rulings of up to 150 lpi.

The table below gives examples of combinations that have been shown to achieve good results.

Printer	Media	Resolution (dpi)	Screen ruling (lpi)	Screen angle	Dot shape
HP Designjet 30/60/90	EFI Premium Proof 8260 Semiglossy	1200 x 1200	114		Ellipse
HP Designjet 30/90/130	ZP 55	600 x 600	50		Ellipse
HP Designjet 4000	ZP 55	600 x 600	106		Ellipse
Epson Stylus Pro 4000/4800/7600/7800/9600/9800	EFI Premium Proof 8260 Semiglossy	1400 x 720	60	15/75/0/45	Ellipse
OKI 9600	EFI 92 M	600 x 1200	120	15/75/0/45	Round

**NOTE:** Moiré prevention in EFI XF is defined by a mathematical algorithm and is based on screen ruling and screen angle. Please note that it is not possible to prevent moiré effects resulting from the composition of the image itself. For example, an image of a man wearing a pin-stripe suit will almost certainly still display moiré patterns in the printout.

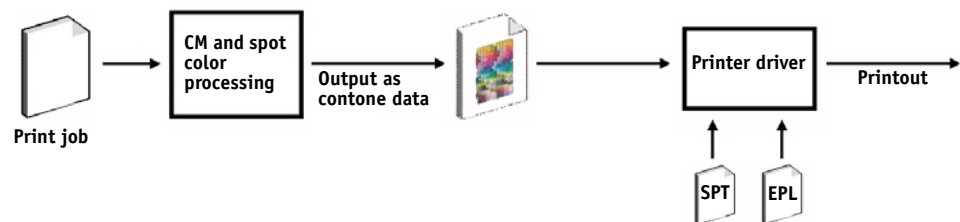
## v1 and v2 screening methods

EFI XF supports two types of screening methods — v1 and v2. EFI XF 2.6 and 3.0 support method v1 only. For program version 3.1, an additional, alternative screening method was introduced.

### v1 screening

Using the v1 method, the screening file is applied to the **output** data. The printer driver processes the screening file and creates the output data. This means that the paper white simulation and full tones are also screened.

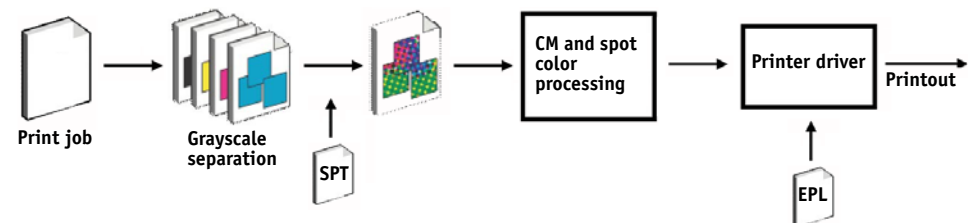
v1 workflow



### v2 screening

With the v2 method, the screened file is applied to the **input** data. The input data is separated into grayscales, then the SPT file creates the screened data. Thereafter, the separated files are treated the same as one-bit files.

v2 workflow



This method of screening permits higher screen rulings and does not screen paper white simulations or full tones.



Please observe the following when applying the v2 screening method:

- Input files must be in the CMYK color space. v2 screening cannot be applied to RGB or L\*a\*b\* data.
- The screening and printer resolution must be the same.
- It is not possible to create an EFI Remoteproof Container with v2 screened print jobs.

### Implementation in EFI XF

EFI XF uses different methods to implement v1 and v2 screening.

Method v1 requires you to create a new media profile that incorporates the screening file. For method v2 you can “patch” the screening file to an existing base linearization and media profile. The only requirement is that the screening file and the base linearization must be created for the same printer resolution.

The EFI XF Server applies v1 or v2 screening automatically, based on an internal evaluation of the incoming data.

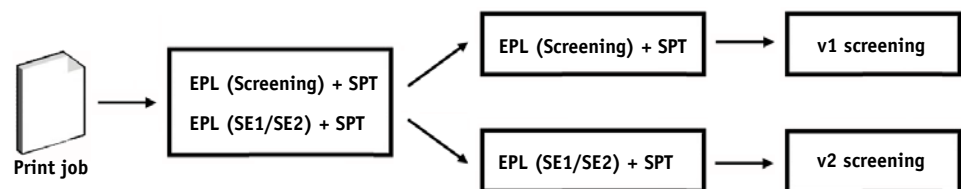
The v1 screening method is applied if the Server detects:

- a base linearization file created for the halftoning method Screening
- an attached SPT screening file

The v2 screening method is applied if the Server detects:

- a base linearization file with the halftoning method Error diffusion (SE1) or Stochastic screening (SE2)
- an attached SPT screening file

v1/v2 screening in EFI XF



### Comparison of v1 and v2 screening

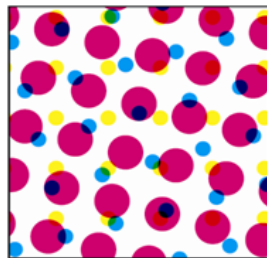
The table below compares the two screening methods:

	v1	v2
AM screening — achievable screen ruling	100 lpi (with certain screen settings)	Up to 150 lpi (depending on the printer configuration)
Screening settings definable for each color in print job	Yes. Spot colors can be linked to one of the screening settings for C, M, Y or K. The default setting is black.	Yes. Spot colors can be linked to one of the screening settings for C, M, Y or K. The default setting is black.
Output	Composite printout in pure inkjet CMYK screening	Composite printout includes screening for each color in print job.
Screen dot	Pure inkjet dot	Color-managed dots. Use of light inks.

	v1	v2
Color accuracy	By overprinting of pure inkjet dots	By overprinting of color-managed dots
Paper white simulation	Screened	Contone
Full-tone reproduction	Screened	Contone
Support of contone printer mode (e.g. Epson Stylus Pro 3800)	No	Yes
Linearization/profiling	New linearization and profiling using the screening file necessary	Can be patched to any existing EPL, as long as the screening resolution is the same as the printer resolution.
Speed	-	Up to 50% slower than v1
Dot sharpness	-	Slightly less sharp than v1

The differences in output are illustrated in the following diagram.

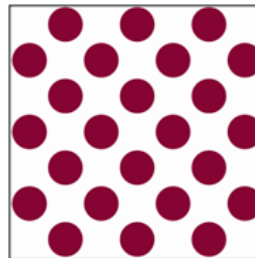
30% spot color dot



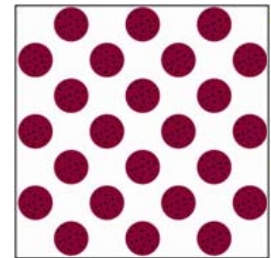
v1

Pure inkjet CMYK. Color management via overprinting of pure inkjet dots.

Color accurate, but different screening



Printing press



v2

Color-managed dots. Norm and light color. Color management via inkjet halftoning.

Color accurate, with same screening

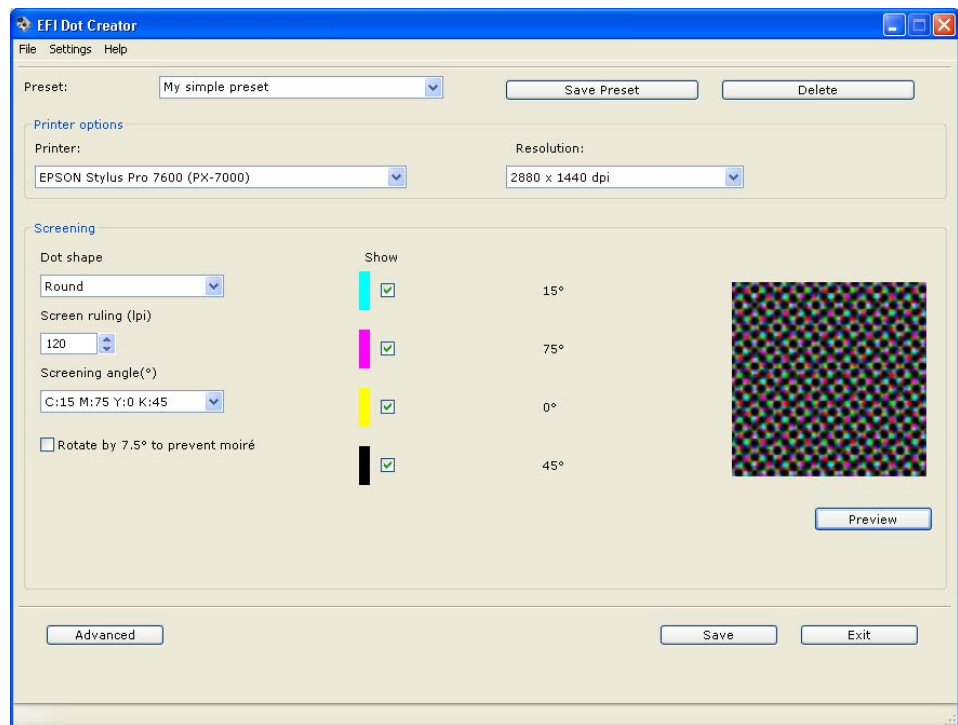
## Creating a halftone screen file

Regardless of whether you want to implement v1 or v2 screening, the first step is to create a halftone screen file with the desired screening information.

### TO CREATE A HALFTONE SCREEN FILE

#### 1 Start Dot Creator.

Dot Creator window



#### 2 Select your printer and a printer resolution.



For v2 screening, make sure that you select the same printer resolution as defined for the EPL base linearization of the media profile you will be using.

#### 3 Select a dot form.

#### 4 Select a screen ruling.

#### 5 Select a screening angle.

A number of predefined settings for CMYK are available. Alternatively, by clicking Advanced, you can define customized screen rulings and screening angles for each separate color channel.

#### 6 Save your screening file.

For v1 screening the next step is to create a new media profile. For v2 screening you only need to “patch” the screening file to the existing base linearization file. Follow the steps in the appropriate sections below.

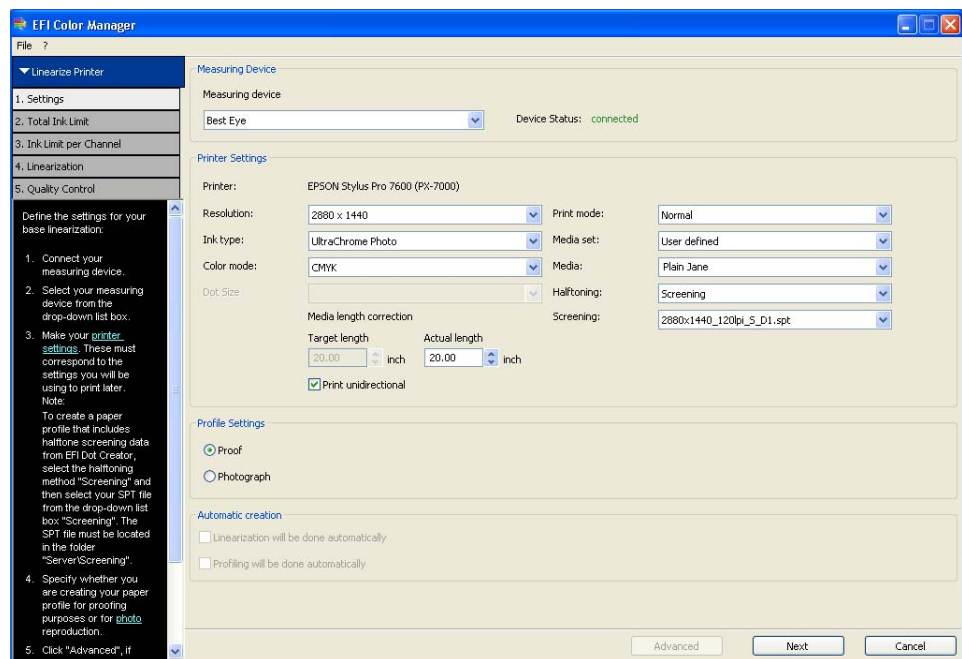
## v1 screening: creating a new media profile

For v1 screening, you now need to create a media profile.

### TO CREATE A MEDIA PROFILE IN COLOR MANAGER

- 1 In EFI XF, ensure that your printer is set up as the linearization device.
- 2 Make sure your measuring device is connected to the computer.
- 3 Start LinTool/Color Manager and select the tool Create Base Linearization.

#### Base linearization settings



- 4 In the Settings window, select your measuring device.
- 5 Make your printer settings. The following settings are recommended:

Resolution	You must select the same resolution that you used to create the SPT file.
Ink type	Depends on the printer.
Color mode	CMYK <b>NOTE:</b> This setting is automatically selected when you select “Screening” as the halftoning method.
Print mode	Depends on the printer.
Media set	Select the media set at the printer’s control panel. If your printer does not support this feature, select User defined.
Media	Define any media name or select your media from the drop-down list box. <b>NOTE:</b> If your printer supports printing on dot film, you can select this media from the drop-down list box. A separate know-how guide article is available for screened output on Epson Stylus Pro 4000 and x600 printers.
Halftoning	Select Screening.
Screening	Select the SPT file you created in EFI Dot Creator.

- 6 Select Proof as the profile setting.
- 7 Click Next.
- 8 Click Print to output a test chart with a predefined total ink limit of 400%.



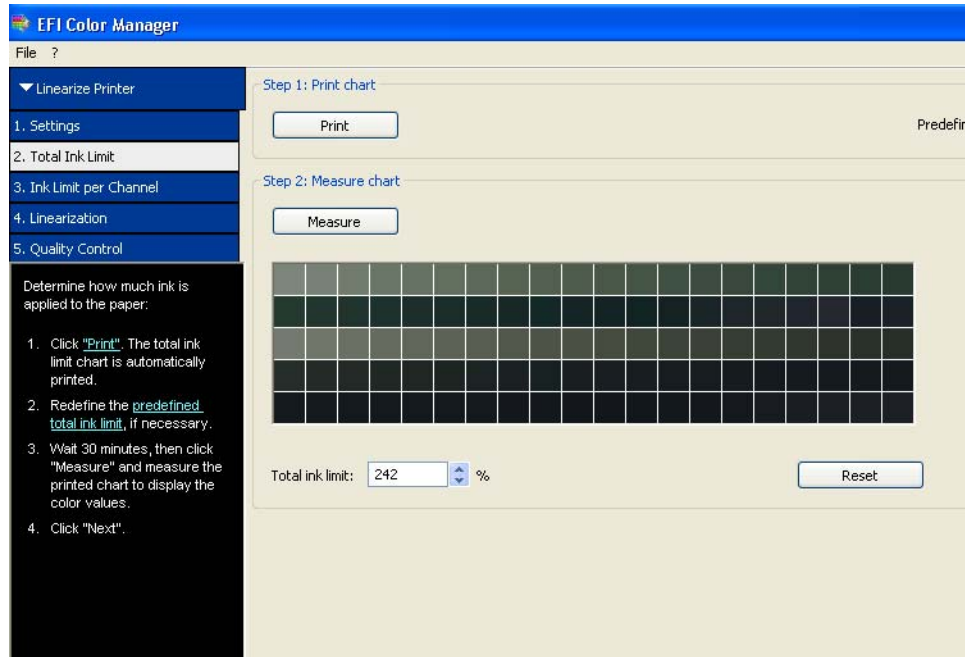
If you are creating a base linearization for dot film, you do not actually have to output the chart and can cancel job processing in Job Explorer at this point if you wish. Since grayscale output is required, it is not necessary to go on to optimize the ink limits of the color channels.

Although the base linearization created in this way contains only a linear gradation curve, it provides all the settings necessary for it to be correctly detected by EFI XF. However, if you choose to cancel job processing at this point, you should also create and implement a visual correction curve in EFI XF. For output on dot film, all you have to do is copy the base linearization file to the EFI XF Profiles folder and the SPT file to the Screening folder. No media profile is necessary as grayscale output on dot film does not require color management.



For all other media, continue to follow the steps below.

#### Base linearization: Total ink limit



**NOTE:** The predefined ink limit is 400%. However, you may need to reduce this and reprint the chart if your printout is saturated with too much ink. Once you are happy with the result, proceed to the next step.

#### 9 Click Next.

#### 10 Follow the instructions in the wizard to output and measure the test chart. This step determines the optimized ink limits for each primary color. Then click Next.

**NOTE:** For all versions of EFI XF up to and including 3.1 SP1, the color channels are adjusted automatically to the  $L^*a^*b^*$  values of the simulation profile ISOcoated.icc. All versions of EFI XF from 3.1 SP2 conform to the new ISO 12647-7 specifications, for which the simulation profile ISOcoated\_v2\_eci.icc defines the new standard for offset printing.

#### 11 Output and measure the linearization chart. Then click Next.

#### 12 Output and measure the quality control chart. In the printout, check the gray balance, the total ink limit.

**NOTE:** If you wish, you can click Create Report to obtain a printout with a summary of the base linearization settings.

#### 13 In the Quality Control dialog, click Save and Finish. When prompted whether you want to go on to create a media profile, click Yes.

#### 14 Follow the instructions in the wizard to create a media profile.

You can now implement v1 screening in EFI XF. Proceed to Implementing screening in EFI XF for further information.

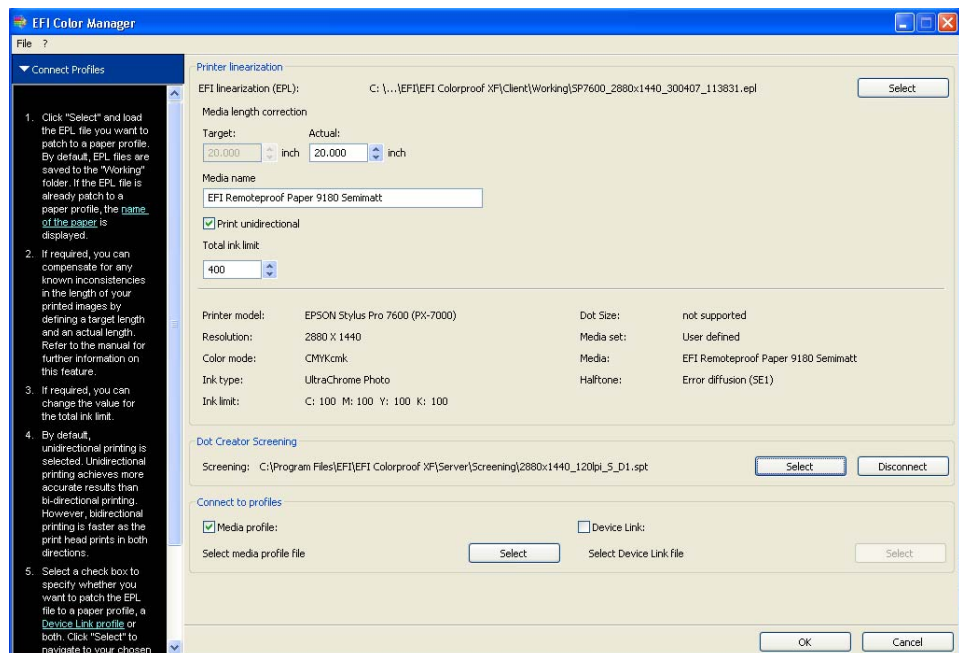
## v2 screening: “patching” the screening file to an existing base linearization file

For v2 screening, you use Profile Connector to “patch” the screening file directly to the base linearization file.

### To “PATCH” THE SCREENING FILE TO AN EXISTING BASE LINEARIZATION FILE

- 1 In EFI LinTool/Color Manager select the tool Profile Connector.

#### Profile Connector



- 2 Click Select and load your base linearization file.
- 3 Make sure that the correct media name, as displayed in EFI XF, is shown.
- 4 Check that the base linearization file was created for the same resolution as the halftone screen file.

If the halftone screen file was created for a different resolution, you will not be able to load it in Profile Connector.

- 5 Check that the base linearization was created for the halftoning method error diffusion (SE1) or stochastic screening (SE2).



It is important that the base linearization file was created for one of these two halftoning methods. If Screening is shown as the halftoning method, EFI XF will automatically apply the v1 screening method.

- 6 In the area **Dot Creator Screening**, click **Select** and load the **SPT screening file**.
- 7 In the area **Connect to profiles**, make sure the check box **Media profile** is selected and the **media profile displayed**.
- 8 **Click OK**.

The halftone screening file is now patched to the media profile.

**NOTE:** Although good results are achieved if you “patch” an SPT file to an existing base linearization, you can achieve an even better print quality if you create a new base linearization and media profile.

## Implementing screening in EFI XF

The following steps describe the settings to be made in EFI XF.

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### TO OUTPUT SCREENED FILES

- 1 **Start EFI XF and go to System Manager.**
- 2 **Set up a new output device for your printer:**
  - **On the Quality tab, make sure that you select the same ink type that was used to create the EPL linearization file in LinTool/Color Manager.**
  - **From the drop-down list box Media name, select the name defined in LinTool/Color Manager.**

**NOTE:** If the media name is not displayed, try restarting the Server.

- 3 **From the drop-down list box EFI Calibration Set, select the EPL base linearization file that is linked to the SPT screening file.**

For v1 screening, the screening file you created in Dot Creator is displayed in the properties list, along with the halftoning method Screening. For v2 screening, you see the screening file and the halftoning method error diffusion (SE1) or stochastic screening (SE2).

- 4 **Click Save to save your settings as a media set.**
- 5 **Save the workflow.**

When you load a print job, EFI XF detects automatically, based on the halftoning method used to create the base linearization file, whether to apply v1 or v2 screening.