



# Application Notes

## Printing with White Ink or Finish/Varnish



# **Printing with White Ink or Finish/Varnish**

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## Introduction

Nowadays, many printer manufacturer produce printers being able to automatically or half-automatically print white ink or finish/varnish in a special way together with the colored inks or in a separate layer. The **ErgoSoft RIP** offers not only the possibility to control these printers but also a basic way of printing white ink or finish/varnish together with colored inks for many of the other printers.

This documentation will explain the various possibilities of using white ink and finish/varnish as well as the necessary configurations in the **ErgoSoft RIP**.

## Requirements for Using White Ink or Finish/Varnish

In order to print with white ink or finish/varnish the following requirements must be met:

- 1** In order to use white ink or finish/varnish in addition to the four basic ink colors CMYK, the printer must have more than 4 slots for ink cartridges and provide the possibility to configure minimum a 5-color ink setup for CMYK plus any additional ink colors.
- 2** When the white ink or finish/varnish and the colored ink should be printed in different layers, the printer must support this functionality.
- 3** When the printer does not provide the functionality to print white ink or finish/varnish, the print environment for the driver must allow full access to the ink selection for the slots.

## Possibilities to Print with White Ink or Finish/Varnish

The **ErgoSoft RIP** offers the following possibilities to print with white ink or finish/varnish:

### 1 **Automatic Printing with White Ink or Finish/Varnish**

Automatic printing with white ink or finish/varnish means that the RIP software automatically creates the white or finish/varnish layer from the color image and sends the data to the printer. You have just restricted control over the areas that are printed with white ink or finish/varnish.

Chapter “Automatic Printing with White Ink or Finish/Varnish” will explain the necessary settings as well as the restrictions for this method.

### 2 **Using the Automatic Spot Color Replacement in PostScript/PDF Files**

Using the automatic PostScript/PDF spot color replacement of the **ErgoSoft RIP** allows absolute control over the locations where the white or finish/varnish pixels are set.

This method treats the white ink or finish/varnish as any other spot color. Chapter “Using White Ink or Finish/Varnish like a Spot Color” will explain the necessary settings as well as the restrictions for this method.

### 3 **Using an Extra Color Channel in TIFF or DCS Files**

Using an extra color channel (spot color channel) in TIFF or DCS files allows absolute control over the locations where the white or finish/varnish pixels are set.

This method treats the white ink or finish/varnish channel in the image as any other spot color channel. Chapter “Using White Ink or Finish/Varnish like a Spot Color” will explain the necessary settings as well as the restrictions for this method.

### 4 **Using the Manual Color Replacement**

Using the manual color replacement functionality of the **ErgoSoft RIP** allows selecting the white ink or finish/varnish for replacement of any color in any image without having to specially create or modify the image.

This method treats the white ink or finish/varnish as any other available ink in the print environment. Chapter “Manually Replacing Image Colors by White Ink or Finish/Varnish” will explain the necessary settings as well as the restrictions for this method.

### 5 **Setting Printing Parameters for Certain Images**

The global settings for the methods using white ink or finish/varnish for automatic spot color replacement or for printing an extra color channel in the file (methods 2 and 3) can be overwritten for the currently selected image(s). These settings can be saved as image presets for easy re-use for certain images.

This method works only in combination with one of the methods 2 and 3. Chapter “Setting Printing Parameters for Certain Images” will explain the necessary settings as well as its usage.

## Automatic Printing with White Ink or Finish/Varnish

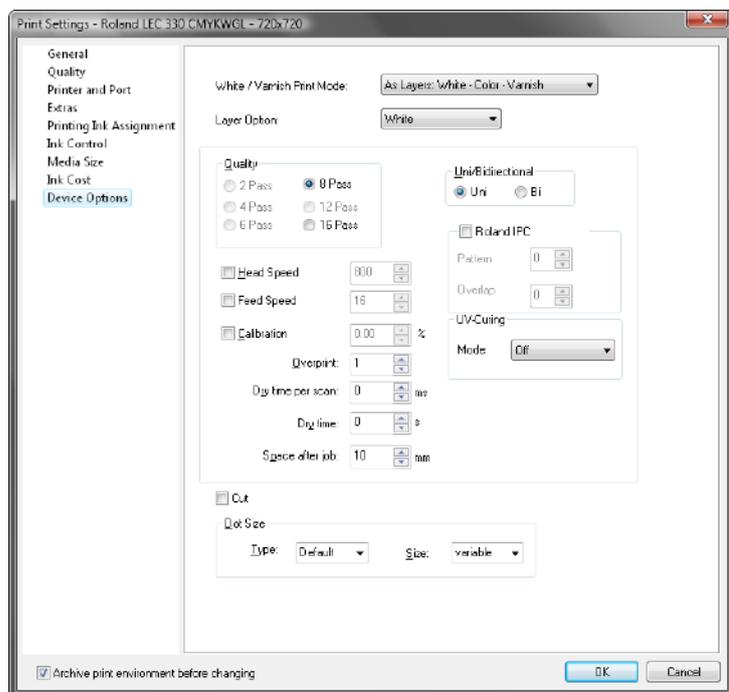
Automatic printing with white ink or finish/varnish means that the RIP software automatically creates the white or finish/varnish layer from the color image and sends the data to the printer. You have just restricted control over the areas that are printed with white ink or finish/varnish.

The **ErgoSoft RIP** offers the automatic white or finish/varnish printing functionality for almost all printer drivers with access to more than 4 ink slots.

## Settings on the Device Options Tab in the Print Environment

When a printer offers a white or finish/varnish printing functionality the **Device Options** tab of the print environment also offers some white or finish/varnish printing options that must be enabled generally in order to activate printing with white ink or finish/varnish.

The image shows the example for Roland LEC 3300 which allows specifying the ink order and some more settings for the white and finish/varnish layers.



The ink order in general is:

- All (white, finish/varnish and colored) ink **together** in one pass
- Each ink type (white, finish/varnish, colored) in **separate layers**: The first ink type in one layer, then the next ink type in another layer, and so on.
- Some printers allow **splitting the heads** for using two ink types together in one step.
- When the printer allows more than one white or finish/varnish layer there might be several selections for the order of white and colored ink (e.g. Zuend UV-Jet allows more than one slot with white ink controlled in the **Device Options**)
- Some printers allow configuring the different ink types in relation to all or some device settings normally available for colored ink.

Please note that when the **Device Options** tab does not show any white ink or finish/varnish option the printer does not support automatic white or finish/varnish printing or that you selected a print driver that is not appropriate to your needs.

## Settings on the Printing Ink Assignment Tab in the Print Environment

Whether your printer provides automatic white or finish/varnish printing or not you always have to specify some settings on the **Printing Ink Assignment** tab.

1 Select the name **Spot Color White ...** for slots with white ink and **Finish/Varnish ...** for slots with finish/varnish.

2 You may specify the density linearization option which is normally not needed and can be left in the default setting.

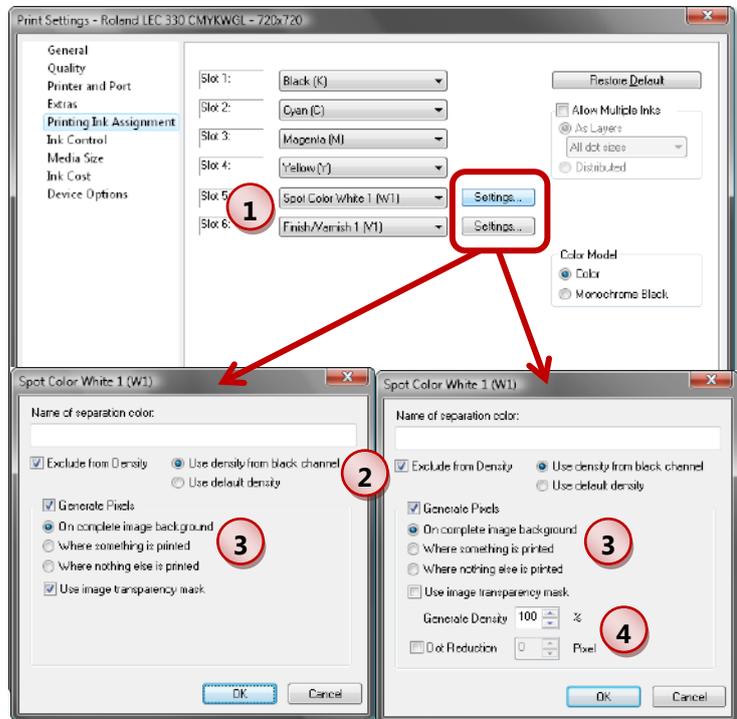
3 Activate the automatic white or finish/varnish printing option by checking **Generate pixels** and specifying where the white ink or finish/varnish should be printed:

- On the complete image background
- Where something is printed (only for drivers creating rasterized output, i.e. dithering method must be selectable)
- Where nothing is printed (only for drivers creating rasterized output, i.e. dithering method must be selectable)
- The **ErgoSoft RIP** can use the transparency mask of the image to automatically print the white ink or finish/varnish only in not transparent areas.
- Please note that the colored ink and white ink or finish/varnish may be printed in the same pass possibly mixing the ink types when the print driver or printer does not offer white ink or finish/varnish functionality on the **Device Options** tab.

4 When the white ink or finish/varnish is **excluded from Density**, it is printed with maximum ink amount possible without the possibility of any limitation. The **Generate Density** value is used to reduce the optical density (maximum amount of ink used) and thus, works similar to the ink limitation in the density linearization.

Select a (positive) **Dot Reduction** value to reduce the area covered by the white ink or finish/varnish elements by the selected value on all borders. E.g. the diameter of a circle will be reduced by double the selected value. To increase the covered area you may enter a negative value manually. Please note that only values between 1 and 4 can be selected; when needing higher values you have to enter them manually.

Please note that these options are not available for **Legacy** print drivers (print drivers not using the new print environment format). For more information about legacy print drivers please refer to the manual part about Print Environments.



## Summary

When the printer offers an automatic white or finish/varnish printing function, you have to activate both the white ink or finish/varnish option on the **Device Options** tab as well as the pixel generation in the settings for the white spot color or finish/varnish on the **Printing Ink Assignment** tab to successfully use the automatic white or finish/varnish printing functionality of the **ErgoSoft RIP**. The white or finish/varnish printing functionality of the printer controls the physical output of the white ink or finish/varnish while the automatic white or finish/varnish printing functionality of the **ErgoSoft RIP** controls where the white ink or finish/varnish is to be printed.

When the printer does not offer an automatic white or finish/varnish printing function, limited automatic white or finish/varnish printing is available by activating the pixel generation in the settings for the white spot color or finish/varnish on the **Printing Ink Assignment** tab. But the colored ink and white ink or finish/varnish may be printed in the same pass possibly mixing the ink types.

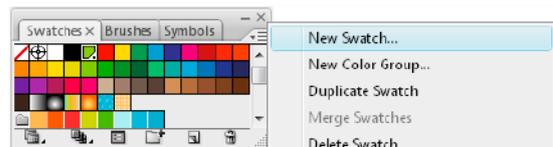
## Using White Ink or Finish/Varnish like a Spot Color

When you want to have absolute control over the locations where the white or finish/varnish pixels are set you have to use the spot color functionality. This also requires some special preparations in the image itself.

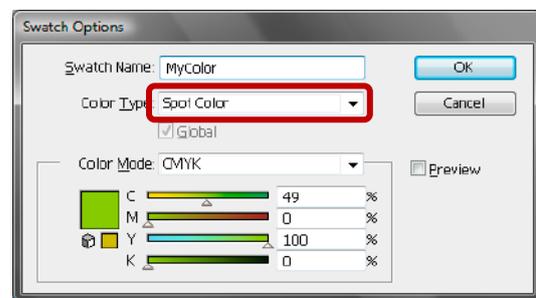
### Preparing the Image for White or Finish/Varnish Spot Color

#### Creating a PostScript-File

In e.g. Adobe Illustrator CS3, select the **New Swatch** option to create a new color swatch.



Now define the name of the color area that should be replaced and make sure that the type of the color is set to **Spot Color**.



Now color the area that should be replaced in the image with the color you just created and save the image in the EPS file format.

#### Creating a Multi-Channel TIFF File or DCS File

In e.g. Adobe Photoshop add a new **Spot Color** channel to the image channels. Fill the areas to be printed with white ink or finish/varnish with any color.

When using white ink and finish/varnish and other spot colors, the spot color channels in the image are assigned to first to **Spot Color...**, then to **Spot Color White...**, and at last to **Finish/Varnish...**. The names for the spot color channels in the image do not matter; just the order of the channels controls the distribution of the image spot color channels on the different **Spot Color...**, **Spot Color White...** and **Finish/Varnish** channels in the print environment.

Please note that before importing the DCS file you should verify that the option **Treat DCS as separated file** is checked in the **ErgoSoft RIP** (menu *Tools > Options > Preferences > Image > PostScript/PDF > Parameters*).

## Settings on the Device Options Tab in the Print Environment

The settings on the **Device Options** tab are the same as already described above for "Automatic Printing with White Ink or Finish/Varnish".

## Settings on the Printing Ink Assignment Tab in the Print Environment

When using the white ink or finish/varnish like a spot color you have to specify some settings on the **Printing Ink Assignment** tab.

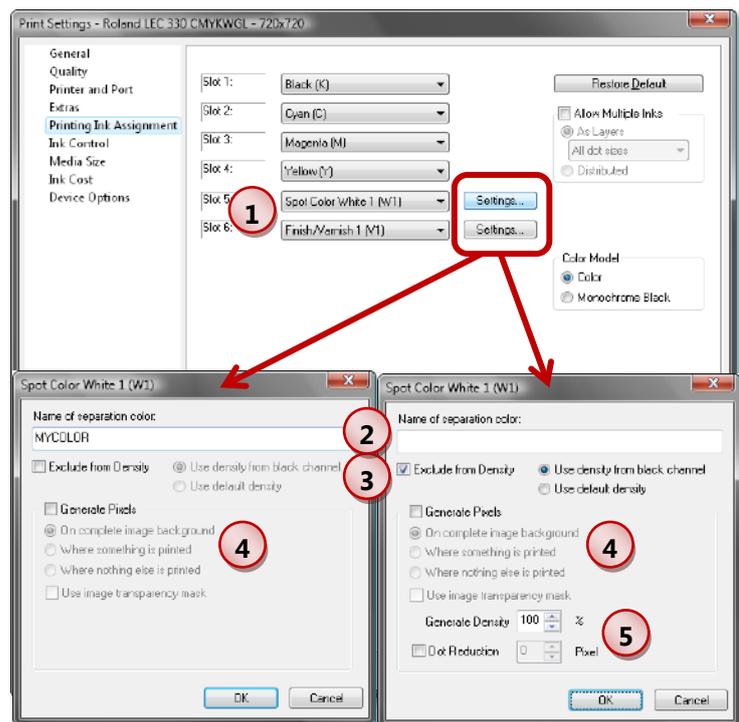
1 Select the name **Spot Color White ...** for slots with white ink and **Finish/Varnish ...** for slots with finish/varnish.

2 When the white or finish/varnish area in the (PostScript) image is design using spot color swatches you have to enter the name of the spot color as **Name of separation color**. When using spot color channels in TIFF or DCS file, the name of separation color is ignored.

3 You may specify the density linearization option which is normally not needed and can be left in the default setting.

4 In order to use the white ink or finish/varnish like a spot color, do not check **Generate pixels**.

Please note that the colored ink and white ink or finish/varnish may be printed in the same pass possibly mixing the ink types when the print driver or printer does not offer white ink or finish/varnish functionality on the **Device Options** tab.



5 When the white ink or finish/varnish is excluded from Density, it is printed with maximum ink amount possible without the possibility of any limitation. The **Generate Density** value is used to reduce the optical density (maximum amount of ink used) and thus, works similar to the ink limitation in the density linearization.

Select a (positive) **Dot Reduction** value to reduce the area covered by the white ink or finish/varnish elements by the selected value on all borders. E.g. the diameter of a circle will be reduced by double the selected value. To increase the covered area you may enter a negative value manually. Please note that only values between 1 and 4 can be selected; when needing higher values you have to enter them manually.

Please note that these options are not available for **Legacy** print drivers (print drivers not using the new print environment format). For more information about legacy print drivers please refer to the manual part about Print Environments.

## Summary

When the printer offers an automatic white or finish/varnish printing function, you have to activate the white ink or finish/varnish option on the **Device Options** tab but not the pixel generation in the settings for the white spot color or finish/varnish on the **Printing Ink Assignment** tab to successfully use the white ink or finish/varnish like a spot color. The white or finish/varnish printing functionality of the printer controls the physical output of the white ink or finish/varnish while the spot color (channel) settings in the image itself control where the white ink or finish/varnish is to be printed.

When the printer does not offer an automatic white or finish/varnish printing function, the colored ink and white ink or finish/varnish may be printed in the same pass possibly mixing the ink types.

# Manually Replacing Image Colors by White Ink or Finish/Varnish

Using the manual color replacement functionality of the **ErgoSoft RIP** allows selecting the white ink or finish/varnish for replacement of any color in any image without having to specially create or modify the image. In addition to the settings in the print environment, this method needs manual intervention in the job by performing manual color replacement.

## Settings on the Device Options Tab in the Print Environment

The settings on the **Device Options** tab are the same as already described above for "Automatic Printing with White Ink or Finish/Varnish".

## Settings on the Printing Ink Assignment Tab in the Print Environment

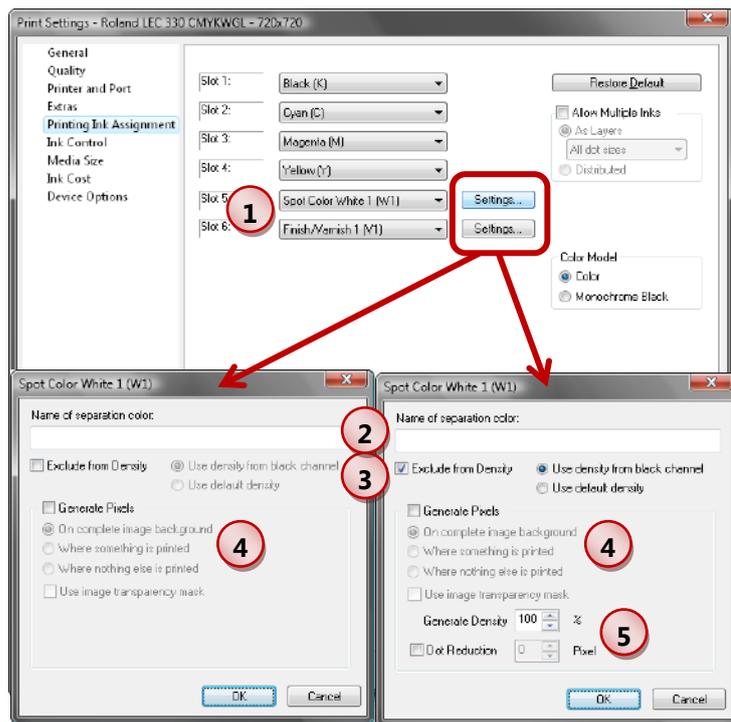
When using the white ink or finish/varnish as a replacement color, you have to specify some settings on the **Printing Ink Assignment** tab.

**1** Select the name **Spot Color White ...** for slots with white ink and **Finish/Varnish ...** for slots with finish/varnish.

**2** When printing PostScript or PDF files, the automatic spot color replacement has priority over manual color replacement. Thus, do not enter a **Name of separation color**.

**3** You may specify the density linearization option which is normally not needed and can be left in the default setting.

**4** In order to use the white ink or finish/varnish like a spot color, do **not** check **Generate pixels**.



Please note that the colored ink and white ink or finish/varnish may be printed in the same pass possibly mixing the ink types when the print driver or printer does not offer white ink or finish/varnish functionality on the **Device Options** tab.

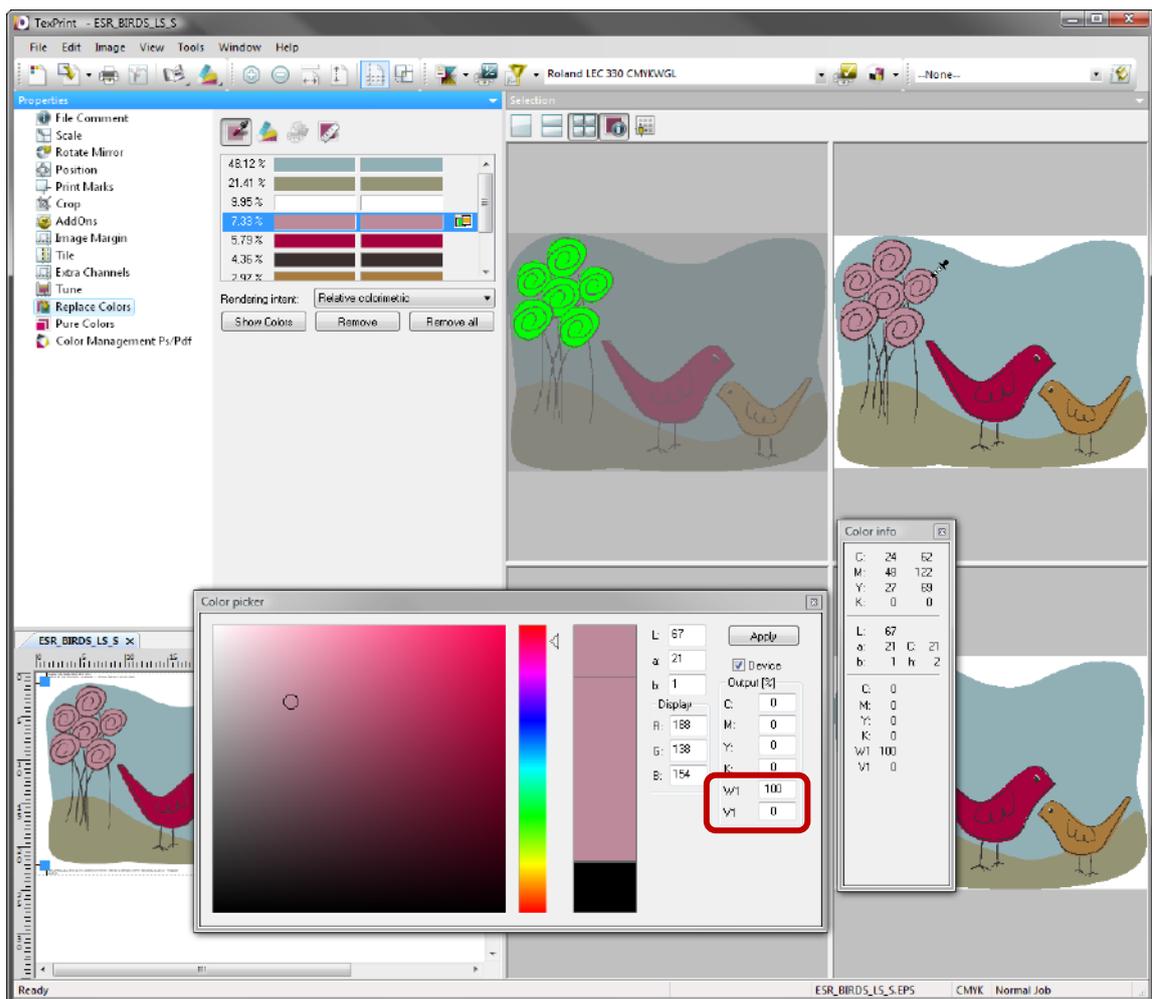
5 When the white ink or finish/varnish is excluded from Density, it is printed with maximum ink amount possible without the possibility of any limitation. The **Generate Density** value is used to reduce the optical density (maximum amount of ink used) and thus, works similar to the ink limitation in the density linearization.

Select a (positive) **Dot Reduction** value to reduce the area covered by the white ink or finish/varnish elements by the selected value on all borders. E.g. the diameter of a circle will be reduced by double the selected value. To increase the covered area you may enter a negative value manually. Please note that only values between 1 and 4 can be selected; when needing higher values you have to enter them manually.

Please note that these options are not available for **Legacy** print drivers (print drivers not using the new print environment format). For more information about legacy print drivers please refer to the manual part about Print Environments.

## Manual Color Replacement

Select the image and launch the manual color replacement by selecting **Replace Colors** in the *Image Properties* window.



Select the color to be replaced, the replacement tool, and enter the value for the replacement color in the channels labeled **W...** for Spot Color White ... and **V...** for Finish/Varnish ...

For more information about manual color replacement please refer to the manual part about Color Replacement.

## Summary

When the printer offers an automatic white or finish/varnish printing function, you have to activate the white ink or finish/varnish option on the **Device Options** tab but not the pixel generation nor enter a name for the separation color in the settings for the white spot color or finish/varnish on the **Printing Ink Assignment** tab to successfully use the white ink or finish/varnish as a replacement color. The white or finish/varnish printing functionality of the printer controls the physical output of the white ink or finish/varnish while the color replacement in the image itself control where the white ink or finish/varnish is to be printed.

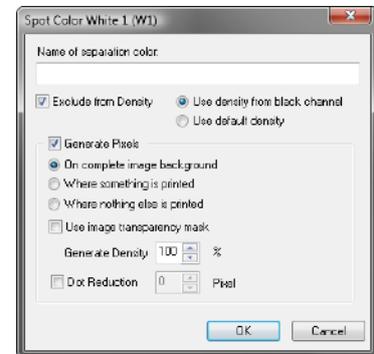
When the printer does not offer an automatic white or finish/varnish printing function, the colored ink and white ink or finish/varnish may be printed in the same pass possibly mixing the ink types.

## Priorities

Since the possibilities for (automatic) printing with white ink or finish/varnish need different settings in the **Printing Ink Assignment** tab, there are certain priorities to be considered.

- 1 Highest Priority (Priority 1)**  
Having checked **Generate Pixel** will activate the automatic white ink or finish/varnish printing and ignore all settings for using white ink or finish/varnish like a spot color or manual color replacement.

It depends on the used file type which of the remaining two white printing possibilities has priority over the other one:

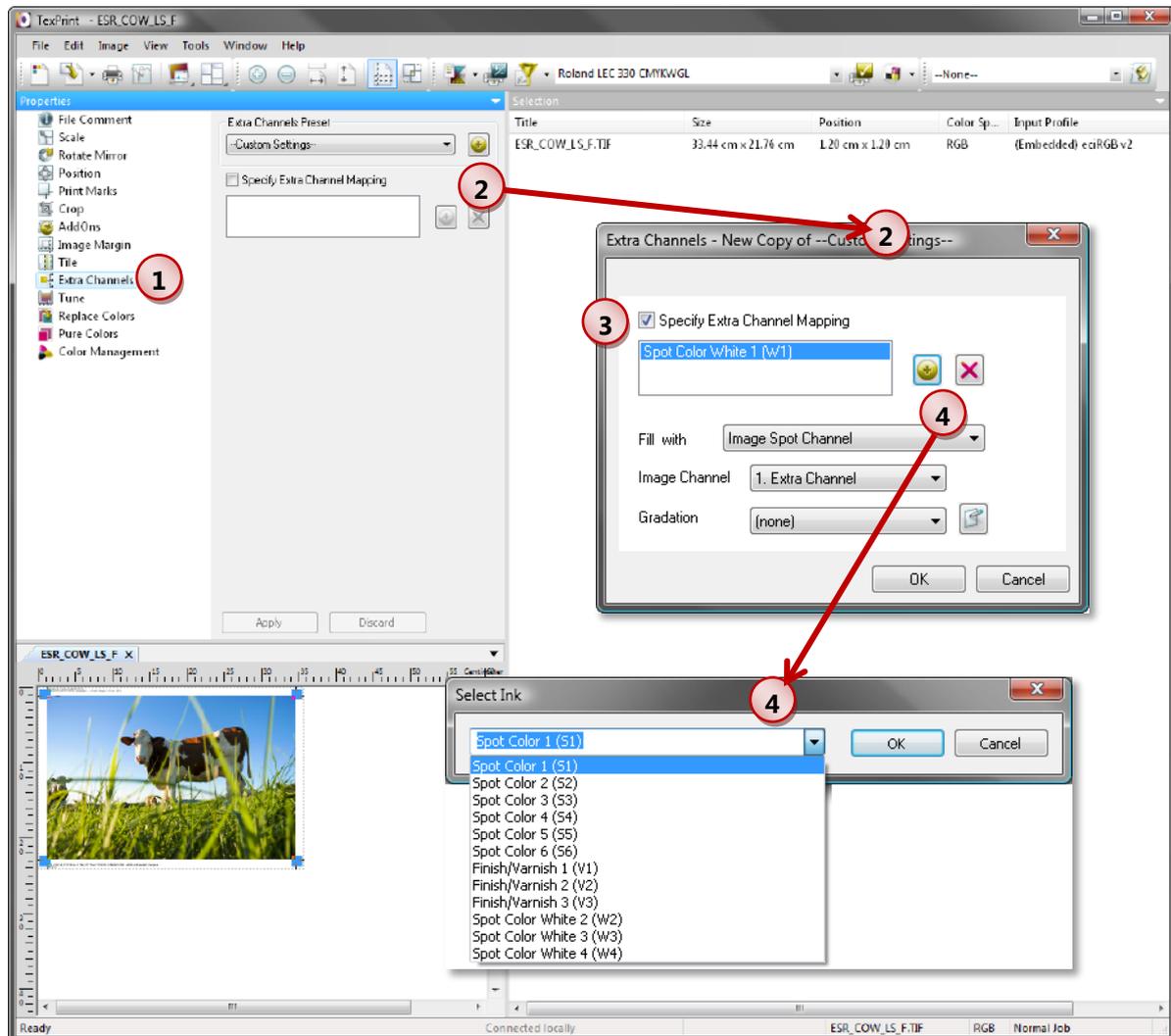


- 2 PostScript and PDF files:**  
Having entered a **Name of separation color** has priority over manual color replacement of the area filled with the named spot color. That means: when e.g. having specified **Name of separation color** "MyColor" and manually replacing the area in the image filled with spot color "MyColor" will reject the manual color replacement and print the named area with **Spot Color White ...** or **Finish/Varnish ...**

- 3 TIFF files:**  
Since TIFF files do not support color names in the file, it does not matter whether you entered a **Name of separation color**. TIFF files simply assign the additional spot color channels to color channels **Spot Color...**, **Spot Color White...** and **Finish/Varnish...** in the named order. Since manual color replacement can be executed for the basic color channels RGB or CMYK only and not for additional spot color channels, manual color replacement will work independently from using additional spot color channels for white ink or finish/varnish printing resulting in manual color replacement having priority over spot color channel usage.

## Setting Printing Parameters for Certain Images

Sometime, preparations for printing with white ink or finish/varnish in the images do not correspond to the settings in the print environment because e.g. another name for the spot color or swatch is used or another order for additional color channels than the ones set up in the print environment. Instead of modifying the image or print environment for these cases, the **Extra Channels** preset or configuration can be used to set special parameters for the selected images. Using the **Extra Channels** configuration also allows printing images with different white or finish/varnish printing settings in the same job.



- 1 To create and select **Extra Channels Presets** use the *Image Properties* page **Extra Channels**.
- 2 Select the **Extra Channels Preset** you want to use with the selected image(s). Click the **New** button to create a new extra channels preset based on the selected one.

3 Check **Specify Extra Channel Mapping** to activate overwriting the white ink or finish/varnish settings in the print environment.

4 Click the **New** button to add a ink color. From the list of extra ink colors, select the one that you want to use for printing with the settings you will specify in the next step. Take care to select just the ink colors that are used in your print environment(s) with which you want to use the extra channel preset.

5 Select the filling method (**Fill with**) and the filling parameter that depend on the filling method. The possible settings are described below; available filling methods are:

- Image Spot Channel
- Custom Color
- Complete Background
- Lightness
- CMYK Median Complement
- CMYK Maximum Complement

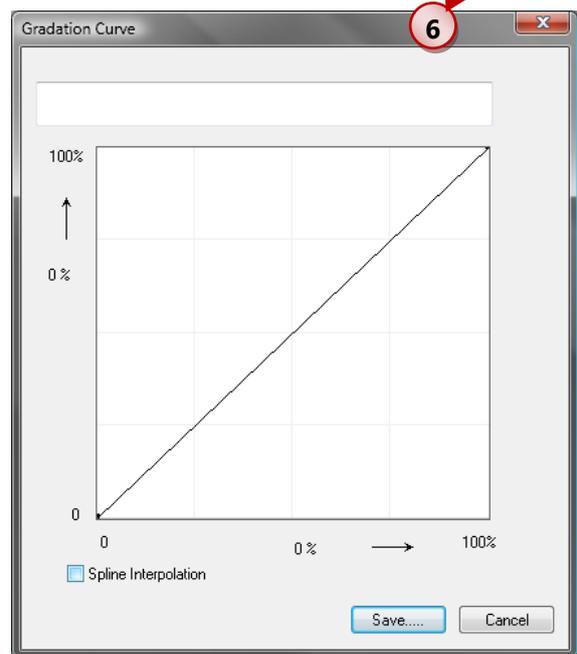
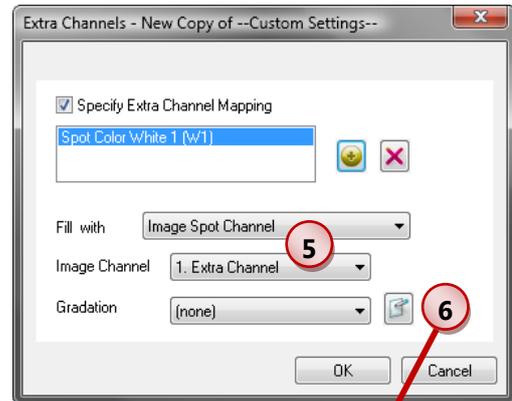
6 Select a **Gradation** curve for using with the selected spot color ink or click the **Edit** button to modify the selected gradation curve.

Specify the gradation curve for the current spot color ink. Check **Spline interpolation** to create a smooth curve instead of points that a connected by straight lines.

Creating a falling curve from the upper left corner to the lower right corner will result in inverting the ink coverage.

Enter a description in the field on top of the dialog and click the **Save** button to save the gradation curve.

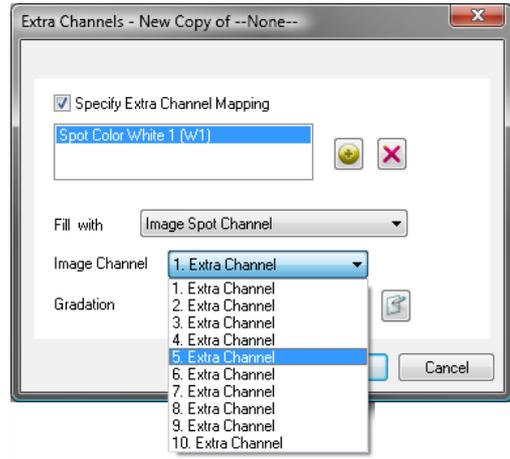
Please note that the gradation is not available for all filling methods.



## Printing Image Spot Color Channels

For TIFF files, additional spot color channels of the image may be assigned to the white ink or finish/varnish.

- Select **Fill with** method **Image Spot Channel**.
- Select the additional spot color channel in the **Image Channel** list of extra channels. When counting the channels, the basic channels CMYK or RGB are omitted so that the list starts with the first additional spot color channel.
- Select the **Gradation** you want to use for the ink channel.

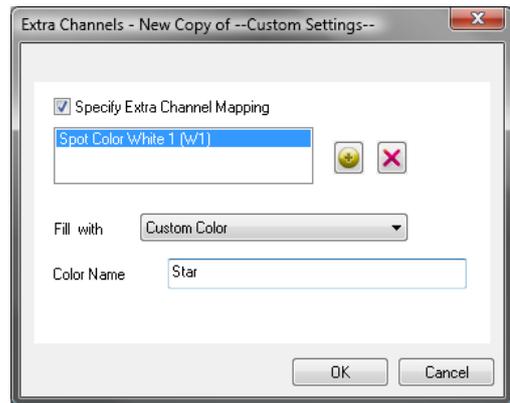


This method works similar to using white ink or finish/varnish like a spot color for multi-channel TIFF files.

## Printing Custom Colors

For PostScript and PDF files supporting custom color names in the file, custom color names may be assigned to the white ink or finish/varnish.

- Select **Fill with** method **Custom Color**.
- Enter the name of the custom color into field **Color Name** or select it from the list that is displayed when configuring the Extra Channels functions not as preset but directly for the selected image.
- This method does not allow selecting a gradation. The intensity (coverage) is specified by the color intensity used when coloring the image with the spot color. When just needing a reduction of the end density, set a density value in the settings of the white ink or finish/varnish in the print environment.



This method works similar to using white ink or finish/varnish like a spot color for PostScript files.

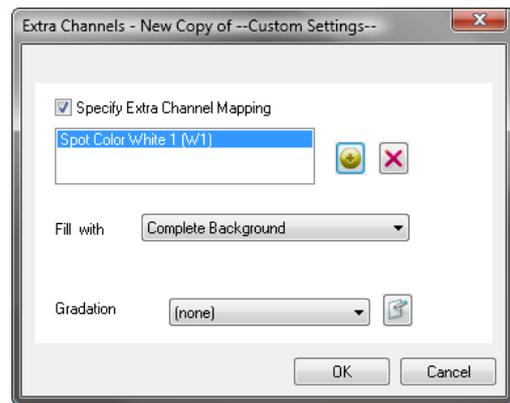
## Printing Image Background



White ink or finish/varnish can be printed on the complete, not transparent image background:

- Select **Fill with** method **Complete Background**.
- Select the **Gradation** you want to use for the ink channel.

The b&w image on the right side shows – colored in black – the parts of the image on the left side that will be printed with white ink.



This method works similar to printing automatically with white ink or finish/varnish and selecting the image background for pixel generation in the white ink or finish/varnish settings in the print environment.

## Printing where Pixels are (not) Set



White ink or finish/varnish can be printed depending on the lightness (L component of Lab value) of the image colors.

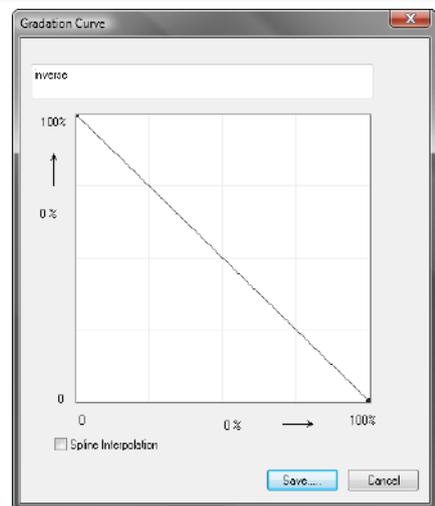
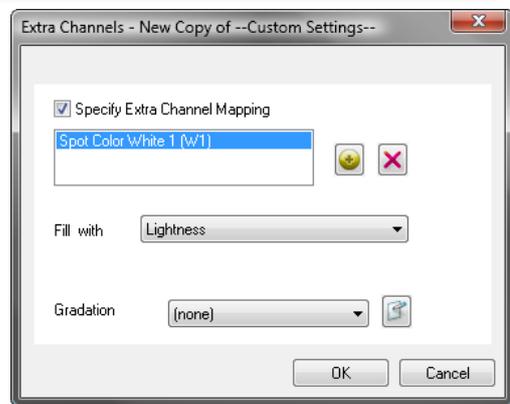
- In order to extract the lightness of the color values, an input profile must be assigned to the image.
- Select **Fill with** method **Lightness**.
- Select the **Gradation** you want to use for the ink channels.

The &w images on the right side shows – colored in black – the parts of the image on the left side that will be printed with white ink.

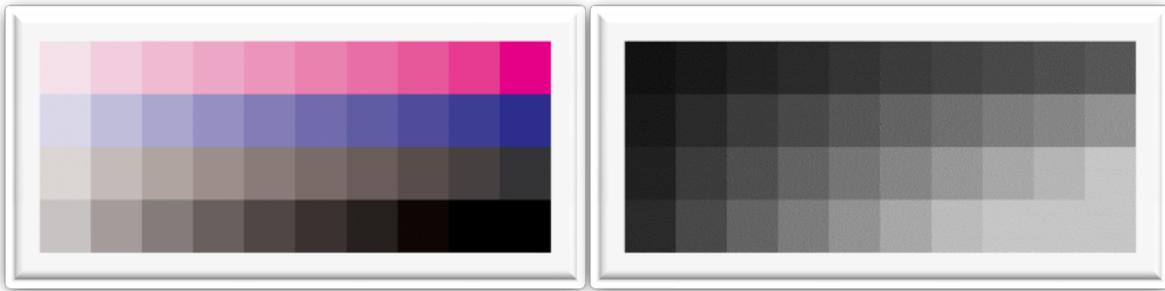
The upper b&w image shows the usage of the default (none) gradation so that white or finish/varnish pixels are printed where no other pixels are set.

The lower b&w image shows the usage of the inverse gradation displayed at the right side so that white or finish/varnish pixels are printed where other pixels are set.

This method is similar to printing automatically with white ink or finish/varnish and selecting methods **Where nothing is printed** (no special gradation) resp. **Where something is printed** (inverse gradation) for pixel generation in the white ink or finish/varnish settings in the print environment.

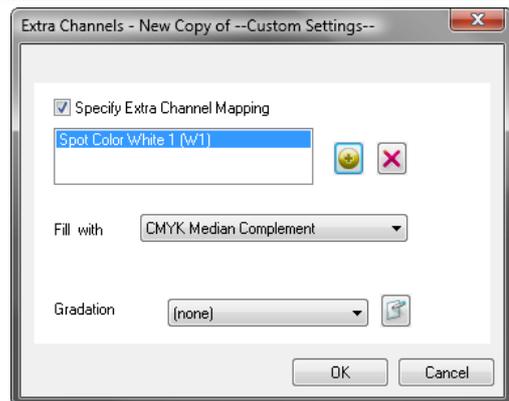


## Printing Depending on Coverage with Colored Ink



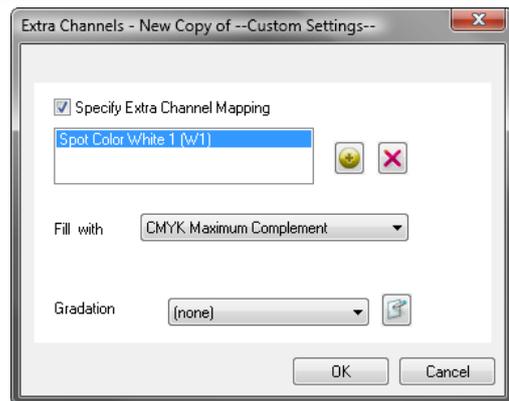
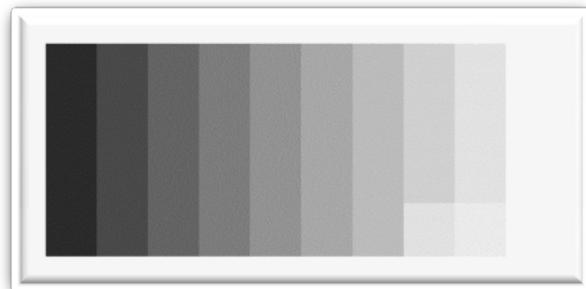
White ink of finish/varnish can be printed depending on the CMYK part of the output values.

- Select **Fill with** methods **CMYK Median Complement** or **CMYK Maximum Complement** depending on the method you want the white ink or finish/varnish values to be calculated.
- Select the **Gradation** you want to use for the ink channels.



The different calculation methods are best explained using the sample:

- The original image (colored image above) is created with 4 rows of patches rising in 10% steps per color. The first row uses Magenta only; the second row adds Cyan with the same percentage values as Magenta; the third row adds Yellow with the same percentage values as Cyan and Magenta; and the fourth row adds Black with the same percentage values as Cyan, Magenta, and Yellow (400% ink maximum).
- The ink limit in the print environment used to create the sample output is set to 300%.
- The **CMYK Median Complement** method is shown in the upper b&w image. It uses different values for white ink or finish/varnish depending on the absolute values of CMYK. The values for white ink or finish/varnish are calculated using the difference between the ink limit used in the print environment and the sum of CMYK values used for output.



- The **CMYK Maximum Complement** method is shown in the lower b&w image. It uses different values for white ink or finish/varnish depending on the relative values of CMYK. The values for white ink or finish/varnish are calculated using the relation of the relative part of used ink per color and the ink limit used in the print environment.

The settings for white ink or finish/varnish in the print environment do not offer a configuration that is similar to this method of creating the white or finish/varnish pixels.