Application Notes

Print Environments

ergosoft

rip solutions

Print Environments

The **ErgoSoft RIP** is available in different editions. Therefore the description of available features in this document does not necessarily reflect the license details of your edition of the **ErgoSoft RIP.** For information on the features included in your edition of the **ErgoSoft RIPs** refer to the ErgoSoft homepage or contact your dealer.

Rev. 1.1

Contents

Introduction

The print environment is the cornerstone of the **ErgoSoft RIPs.** It allows you to define all the necessary information and settings to print on a particular printer/media/ink combination. It contains the printer driver, the dithering method, the linearization of the printer, the output profile, the total ink limit, the port used, and other device settings. In order to get the best printing result, we strongly recommend creating separate print environments for each printer/media/ink combination. For the printout, the print environment is simply selected from the list. Thus, for a certain media, the same configuration may be used without having to select the data every time. All data are selected automatically when the appropriate print environment has been selected.

The *Print Environment Manager* is started by clicking this icon in the *Print Environment toolbar* or by selecting menu *Tools > Print Environments.*

Basic Functions

The *Print Environment Manager* lists all available print environments:
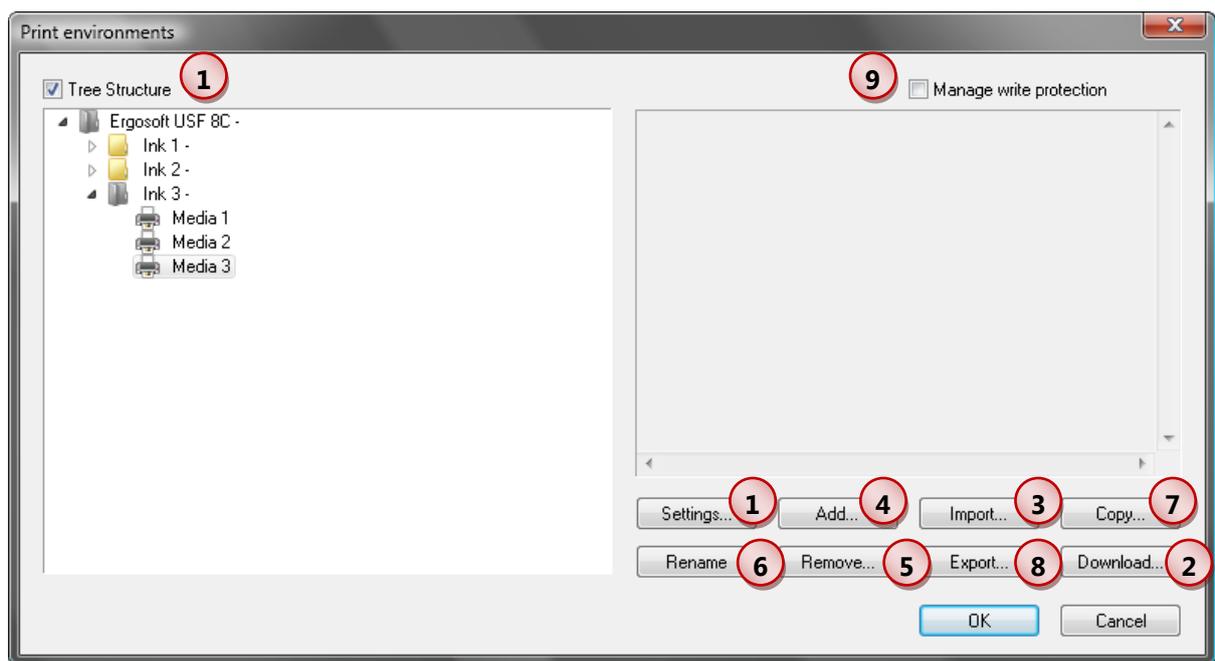
① When **Tree Structure** is checked the available print environments are displayed in a tree structure (as shown in the figure) instead of a standard list. Use menu *Tools > Options > Preferences > Application > Display* to set the separators for the tree structure.

Inserting Print Environments

(2) **Download:** The **ErgoSoft RIPs** offer a number of predefined print environments available on the web. When the connection to the Print Environment Server is established, you may select the print environments that fit best to your current combination of printer, ink, and media. The print environments can be imported directly after the download and/or saved somewhere in your local or network environment for later import on the same or another system. If the imported print environment already exists, overwriting must be confirmed.

Please note that the computer must have internet access in order to download print environments.

(3) **Import:** Print environments that are saved on any data media available from the current computer system (such as network drive, CD, DVD, etc.) may be imported into the **ErgoSoft RIPs.** Just navigate to the source folder and select the print environments to be imported. If the imported print environment already exists, overwriting must be confirmed.

(4) **Add:** If a print environment does not exist for your desired printer configuration and media or if the print environment does not suit your temperature/humidity environment, you will need to create your own.

- Click on the + to the left of the printer name to open the list. Select the print environment that is to be used as basis for the new print environment from the print environments listed in **Driver.**
- All print environments starting with "*" are installed with the **ErgoSoft RIP.** These print environments do not contain any specific settings, thus, should not be used without having been controlled and adjusted.
- Enter the **Name** of the new print environment. We recommend entering the media name, the creation date, and other important information in the name that will help you in recognizing the print environment later on.
- After having closed the dialog box by clicking on **OK,** the print environment may be configured directly.
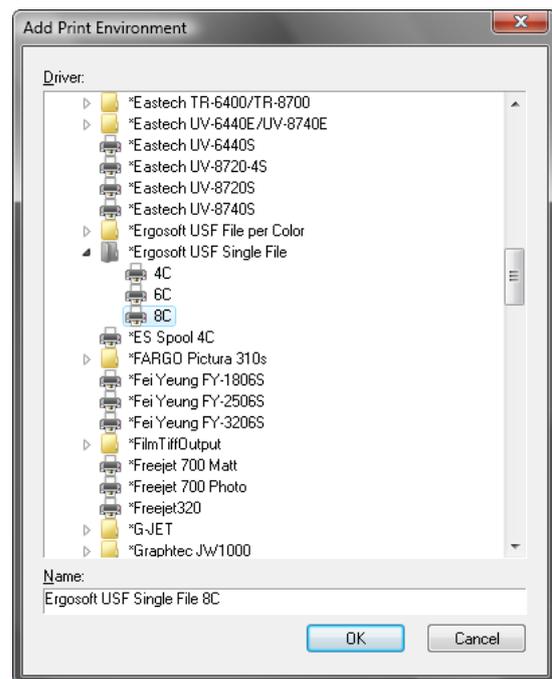
Deleting Print Environments

(5) Remove: When you do not need the print environment any longer, you may remove it from the print environment list as well as from your hard disk.

Managing Print Environments

(6) Rename: The name of the selected print environment can be modified when needed.

(7) Copy: Copying an existing print environment may be useful when you just need to make some changes to the current settings for testing purposes or others. This function can also be used to add a new print environment that is based on the settings of a current one.

(8) Export: Print environments can be exported in order to save them on any location on your system e.g. for transferring them to another system. Select the location of the exported print environment in another dialog box; the name of the print environment in the list of print environments will be the name of the exported print environment file. When more than one print environments are selected (not available in the Tree Structure), a print environment package is exported.

(9) Manage write protection: To secure a print environment from being modified accidentally, it can set to be 'write protected' (read only). Please note that this function only works on the selected print environment when the box is checked while closing the *Print Environment Manager* with **OK.**

Configuring Print Environments

(1)   **Settings:** The settings of a print environment can be accessed from the *Print Environment Manager* or by clicking this icon in the *Print Environment toolbar*. The print environment has a minimum of 5 tabs for standard settings: **General, Quality, Printer and Port, Extras,** and **Media Size.** When the printer allows changing the default slot settings for the ink cartridges another tab **Printing Ink Assignment** is available. Additional tabs **Ink Control, Ink Cost,** and **Device Options** are available for most printers.

Please note that the availability of configuration options highly depends on the selected basic printer driver.

The global option **Archive print environment before changing** allows automatically creating a backup copy of the original print environment in the standard archive folder.

Tab "Quality"

The **Quality** tab contains information about the printer resolution, the dithering method, the total ink limit, the density linearization, and the printer profile.

(1)   Select the **Resolution** for printing. When the printer can only print with one resolution, this field is disabled and the resolution is displayed.

The resolution is displayed - depending on the printer used - either as printer mode or in DPI.

For some printers the resolution may be set on the **Device Options** tab instead.

(2)   List **Dithering** allows selecting the dithering method to be used.

(3)   The **Apply Total Ink Limit** box allows for the specification of the maximum percentage of Cyan, Magenta, Yellow, and Black inks that may be used for printing. 300 % may be used as a guiding value. Please note that the color values in additional profile color channels and additional spot color channels are not modified.

The method used will care for the original gray value of the color; the colors may become too light.

Thus, we recommend reducing the total ink limit only when it is absolutely necessary. When the total ink limit is set to a value that is too low, the range of printable colors will be reduced. This will lead to printouts of lesser quality.
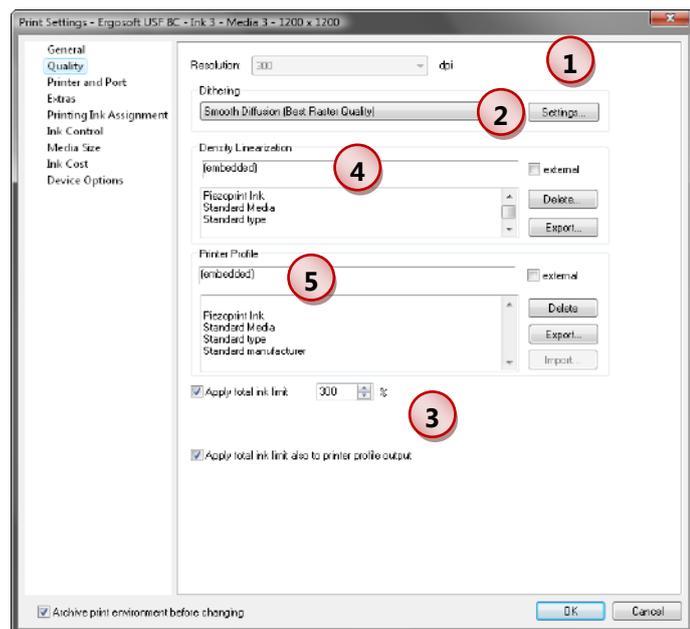
Check **Apply Ink Limit on top of Printer Profile** to limit the amount of ink for Cyan, Magenta, Yellow, and Black always to the specified ink limit – even if the printer profile has a higher ink limit. Please note that this may result in color changes – especially when the printer profile has 5 or more color channels (e.g. CMYKOG) because the values in the additional color channels are not modified by the ink limit.

(4) Dialog part **Density Linearization** allows a pre-defined density linearization to be loaded.

By default, the density linearization is part of the print environment file (embedded). When checking **external,** an external density linearization file can be selected for the print environment. Click on the arrow next to the name of the current density linearization file to get a list of the available density linearization files from which one may be selected. A short description of the selected density linearization file is displayed in the box below the name. Uncheck **external** to embed the external density linearization file into the print environment. Please note that the print environment with the external density linearization must be saved (closed and re-opened) before you can embed the density linearization.

Clicking on **Delete** removes the selected density linearization after confirmation from the print environment or from the hard disk - depending on whether it is an embedded or external density linearization.

Embedded density linearizations can be exported into external density linearization files by clicking on the **Export** button.

The creation of a density linearization is described in the density manual.

(5) Dialog part **Printer Profile** allows a pre-defined printer profile to be loaded.

Printer profiles are created using the optional *ColorGPS* profiler to adjust the output to the inks and media. Printing takes more time when a printer profile is used.

By default, the printer profile is part of the print environment file (embedded). When checking **external** an external printer profile can be selected for the print environment. Click on the arrow next to the name of the current printer profile to get a list of the available printer profiles from which one may be selected. A short description of the selected printer profile is displayed in the box below the name. Uncheck **external** to embed the external printer profile into the print environment. Please note that the print environment with the external printer profile must be saved (closed and re-opened) before you can embed the printer profile.

Clicking on **Delete** removes the selected printer profile after confirmation from the print environment or from the hard disk - depending on whether it is an embedded or external printer profile.

Embedded printer profiles can be exported into external printer profiles by clicking on the **Export** button.

Clicking on **Import** allows copying printer profiles to the folder in which the **ErgoSoft RIP** expects them to be copied. ErgoSoft AG does not guarantee that profiles that are not created with help of the optional *ColorGPS* profiler can be used by the **ErgoSoft RIP.**

The creation of a printer profiles with the optional *ColorGPS* profiler is described in the ColorGPS manual.

When not having selected a printer profile and printing RGB images (always with input profile) or Lab images or CMYK images with input profile, the **ErgoSoft RIP** will use a default separation. The default separation causes the gray value component of a color to be printed with black and CMY. In most cases this will improve the print quality.

Dithering Methods

Basics

- There are two groups of raster types: irregular rasters and regular rasters.
- Regular rasters: Screen Printing Applications. It can look like pictures in newspapers. Screen printing Applications can be customized and is used for screen printing.
- Irregular or random like rasters: Smooth Diffusion and Stochastic3e which both can be customized.
- Both Smooth Diffusion and Stochastic3e can handle more than 4 dilutions of one ink (e.g. 6 or 7 black tones).
- When changing the dithering method (raster) or the settings for a raster, creating a new density linearization is recommended.

Smooth Diffusion / Stochastic3e

Smooth Diffusion is based on a Floyd Steinberg error diffusion with special care for more than one light ink per color combined with variable dots. The features are:
- Reduction of vermicular artifacts in very light halftones
- Reduction of noise and structural artifacts in the transition from light ink to full tone ink
- Supporting combinations of light inks and dot sizes with more than 4 components (e.g. variable dot with light cyan and very light cyan)
- Possibility to limit the use of small and medium dot sizes to get good rasters, especially on "difficult" printers such as Roland
- Possibility to optimize the raster result for printers with artifacts in the printout in order to reduce printing artifacts such as horizontal lines (banding) as well as vertical striation (caused by crimped media or transportation rolls)

Stochastic3e is a frequency modulated raster. The detail sharpness is less than the one at Smooth Diffusion. However, the program consumes less calculation time than Smooth Diffusion.

Clicking on the **Settings** button near the dithering method allows specifying some parameters for the raster.

① When there are printing problems such as banding, cords, artifacts, non-smooth transitions in the density, etc. we recommend to move the slider a bit to the right (higher value).

This will reduce printing artifacts at the cost of clearer raster either globally for all colors or separate for each color. A good printer without striation or banding needs factor 0. Printers with striation and/or banding need a higher factor resulting in a coarser printout when looking very close but the artifacts are set suppressed.
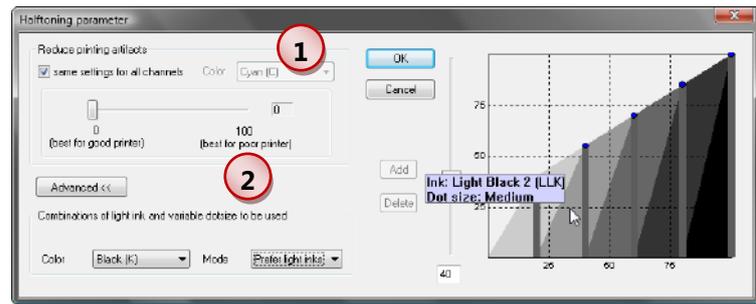
② The **Advanced Settings** allow controlling the usage of ink dilutions and dot sizes.

The graph on the right shows all combinations of dilution levels and dot sizes possible in the current print environment. The horizontal axis represents the optical density represented by the available combinations of ink dilutions and dot sizes. The vertical axis represents the maximum amount of ink used. The graph samples black ink with 3 dilutions (black, light black, and light black 2) and 3 dot sizes (small, medium, and big).

To reduce the amount of ink used for a certain combination of ink dilution and dot size, just drag down the separator line between two combinations of ink dilution and dot size. Small gaps in the linearity of a gradient can be smoothened by reducing the amount of ink used for all combinations except for the darkest one.

In order to meet the request of a continuously rising optical density (horizontal axis) all combinations of ink dilution and dot size must be darker than the one before. Thus, by default, the ink dilution and the dot size as well as the amount of ink used are only allowed to rise with rising optical density. List **Mode** offers some pre-defined combination selections:

- **Auto:** Automatically chooses between "Prefer small dots" and "Prefer light inks" depending on the configuration of your printer with more than one dot size and/or more than one ink dilution per color.
- **Prefer small dots:** This mode first changes the ink dilution from lightest to darkest before changing the dot size from smallest to biggest. All ink dilutions except for the darkest one are printed with the smallest dot size only.
- **Prefer light inks:** This mode first changes the dot size from smallest to biggest before changing the ink dilution from lightest to darkest. All ink dilutions except for the lightest one are printed with the biggest dot size only.
- **User defined:** This mode allows removing the selected combination of ink dilution and dot size and adding another combination of ink dilution and dot size that always meets the requirement of rising optical density.
- **Experienced:** This mode allows the user to add any combination of ink dilution and dot size as well as to set any amount of ink used for any combination without ensuring that the requirement of rising optical density is always met. It is the task of the user to carefully configure and check the configuration with test prints for not running into falling optical densities at any time.

Screen Printing Raster

The **Screen Printing** raster also realizes half tones using regular patterns. This raster is determined by the raster width and the raster angles. Clicking on the **Settings** button near the dithering method allows the values for all channels of the current print color space to be set.

(1) The **Frequency** determines how fine the raster will be. It is specified in **Lines/Inch** or in **Lines/cm.** The higher the frequency, the finer the raster and the better the reproduced continuous tone range of the image. However, the frequency must not be too high because then the pixels on the media merge into one another. It depends on the media quality and print process whether or not to use a rough or a fine raster. Often the manufacturer of a media or the repro or silk-screen partners can recommend a suitable raster. The height of line is calculated from the printer resolution and the wanted number of raster lines. For example, for the often-used raster 12, for 720 dpi printer resolution a frequency of 720/12 = 60 lines/inch must be set.
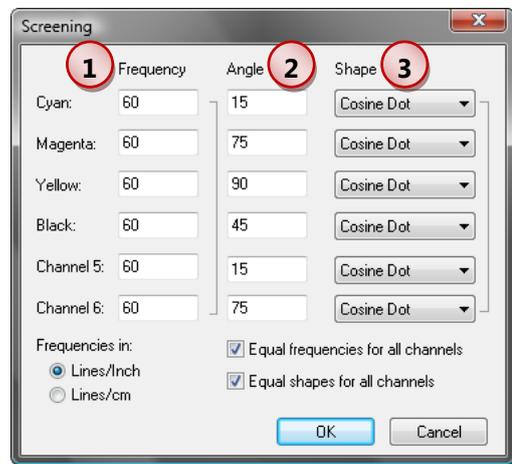
(2) When colored images are printed, all colors are printed – except for the first printed color – one on top of the other with parts of the dots overlapping the dots below. To make sure that as much ink is printed directly onto the paper as possible, the different inks are printed in different **Angles.** It is very important to use correct angles to avoid moiré – a pattern that negatively affects the image quality. In practice, the following angle combination has proved to have favorable effects: Black, the strongest color, is rotated by 45°. Cyan is rotated at 15°, Magenta is rotated at 75°, and Yellow is rotated by 90°.

(3) A raster point is built by many small color points. There are several **Shapes** available for the raster point: Dot, Cosine Dot, several kinds of Ellipse, Line, and Euclidean Dot. Each shape results in another patter. The default Cosine Dot results, in most cases, in a good output, so the shape should only be changed if it is necessary.

Tab "Printer and Port"

The **Printer and Port** tab contains information about the used printer and the port to which the printer is connected and whether the data is sent directly to the printer or first saved on the hard disk and then sent to the printer using the *Print Client.*
As in Windows itself, a **Printer** must be created for each combination of connection and connected output device.

① Select the **Printer** to which you want to print with this print environment. Only printers suitable to the basic print driver for your print environment will be displayed in the list.

② When a spool folder is configured in the printer settings (see below), the usage of the *Print Client* is configured by default. When you want to send the data directly to the port by default you have to **Skip the Print Client.** When using the *Print Client* you have to select the amount of data that must be first saved to the
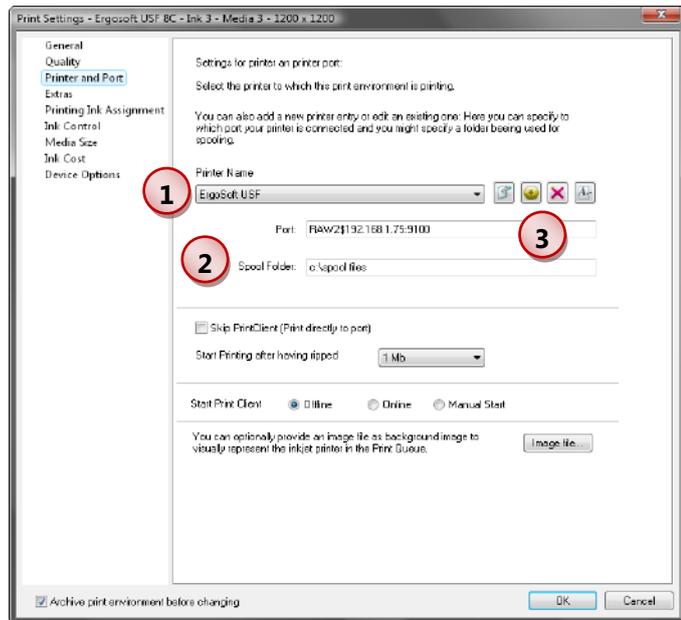
**Spool Folder** before the *Print Client* will start sending data to the printer.

For more information on using the *Print Client* please refer to the manual part about printing.

> For printers with fast connections such as Mimaki JV5, Canon printers and others as well as all Mimaki printers connected to the firewire port, we strongly recommend using the *Print Client* instead of printing directly to the port.

③ Click the **Edit** icon to modify the settings of the selected printer or the **New** icon to create a new printer.

④ The **Name** is used to identify the printer in the **ErgoSoft RIP.** When creating a new printer, the Name is entered when saving the settings. The description is just for your information.

⑤ Select the **Port** to which the printer is connected. Depending on the type of the selected port, the button **Settings** is enabled and allows modifying some port settings. Clicking on **Add** allows another port, such as the name of a network printer, to be added to the list. The available port types depend on the printer type.
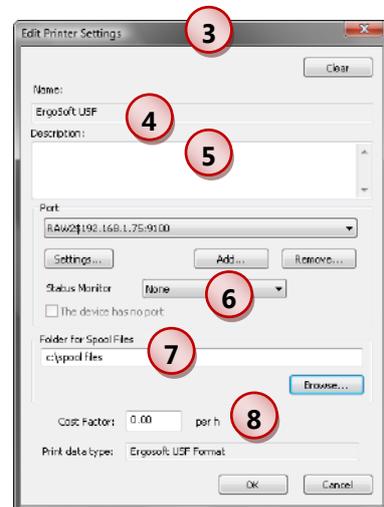
> When adding a TCP/IP port, we strongly recommend using one of the RAW protocol types: RAW for socket version 1.1 and RAW (2) for socket version 2.

The other protocol types are designed for tests with small amounts of data only and can cause severe problems when used in the production.
Hint: The **Port** for the RAW protocol types often is 9100.

6 Select the **Status Monitor** type that can be displayed in the *Print Client.* Please note that the status monitor type must match your printer type. The status monitor is not available for all printer types.

7 Select a folder in which the ripped data for this printer will be saved when the data is not sent directly to the printer. This is the spool folder in which the *Print Client* for this printer will look for data that can be sent to the printer.

8 Enter the **Cost Factor** for the ripping time. This value is used to calculate the computer time dependent part of the production costs that are displayed in the information to the ripped and printed job.

Tab "Printing Ink Assignment"

The **Printing Ink Assignment** tab contains information about the order of inks in the printer.

1 For each slot select the color that is in the corresponding slot of the printer.

Tool *Tools > Linearization & Profile Tools > Print Ink Assignment* prints a chart on the printer to show the channel settings in the printer for all used slots starting with the color that must be configured for Slot 1 at the left side of the printout.

When not printing with all colors, a print environment should be created for each color combination. Color channels that are not used are ignored during printing, but each specified color channel has to be rasterized.

Please note that in colored printing the four basic colors Cyan, Magenta, Yellow, and Black must be selected.

The needed colors for printing with printer profiles are:
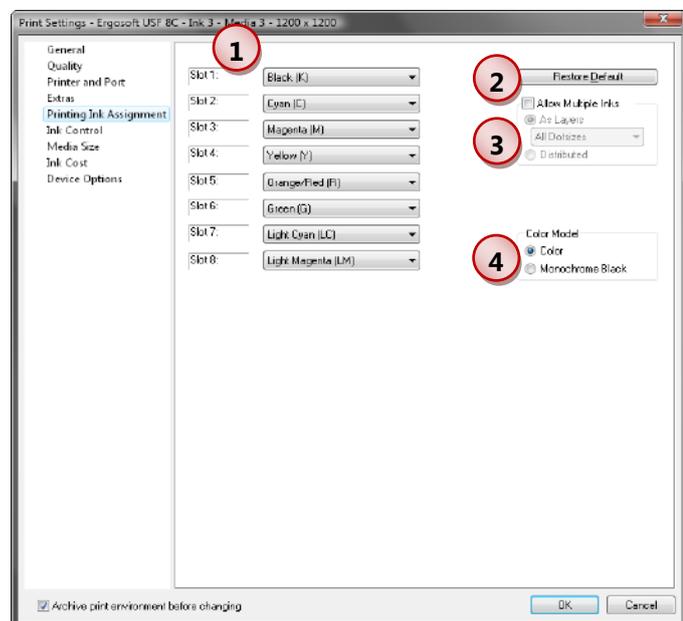
CMYK as first four color channels; Orange/Red, Green, Blue/Violet are used as profile channels 5, 6, 7; followed by "Profile channel 8", "Profile channel 9", etc. When one or more of the colors "Orange/Red", "Green", and "Blue/Violet" are not used they simply can be skipped.

Example:

Ink colors are CMYK, bright blue, Azure, Navy Blue, Lavender (4 blue tones)

Since "Blue" can be selected for only one of the four blue tones (e.g. for "bright blue"), the other three blue tones must be labeled "Profile channel 8", "Profile channel 9", "Profile channel 10".

This means for the printer profile: CMYK are channels 1 to 4, "Blue" is channel 5, "Profile channel 8" is channel 6, "Profile channel 9" is channel 7, and "Profile channel 10" is channel 8.

(2) Click **Restore Default** to restore the default printing ink assignment for the current print environment. Please note that this will overwrite your modifications (except settings for spot colors) without warning.

(3) When your printer can be equipped with two or three cartridges with the same ink (e.g. 2x CMYK) you may want to use two or three cartridges of the same ink color simultaneously. Check **Allow Multiple Inks** in order to select the same ink color in several slots.

The method **As Layers** will use all cartridges with the same ink color together to double or triple the density of the color. When using a variable dot sizes you can specify the dot size for which you want to use the multiple inks. This method has the same effect as printing several ink layers but is much faster.

Selecting **Distributed** will print with all cartridges of the same color, but with only one at a time. The used cartridges are chosen randomly. This method lets you print longer before you have to refill the ink.

In some versions of the **ErgoSoft RIP** the **As Layers** mode is only available in the monochrome color model.

(4) Normally, the used **Color Model** is "Color". When the printer is set up for monochrome printing with several dilutions of the black ink you can select the color model "Monochrome Black" in order to use black and light black inks only.

For more information on the monochrome color model please refer to the manual part about monochrome printing.

> When the specified color order does not meet the actual color order in the printer, "incorrect" colors will be printed.

Tab "Ink Control"

The **Ink Control** tab allows configuring the ink control strips printed automatically with each job.

(1) The **Production Strip** allows printing small strips along the left and/or right side of the job in order to prevent ink heads from becoming dry.

Since the production strip is not meant for being used as visual control whether the heads are printing correctly, all heads can print at the same position. Thus, the available ink slots are divided into the available number of strips (Strip Count) with a configurable maximum amount of ink used (Coverage).


(2) The **Visual Control Strip** allows printing strips along the left and/or right side of the job with all inks visible for visual control of the condition of the print heads and nozzles.

Mode **Dot Sizes in Row** prints patches for all dot sizes of one ink color side by side requiring the strip width for each dot size. The specified number of shades of each ink color is printed one under the other along the job length – one color after the other.

Mode **One Column** prints patches for all combinations of dot sizes and specified shades of one ink color one under the other along the job length – one color after the other. Thus, the strip always has just one patch in width.

Mode **Continuous** prints strips for all combinations of dot sizes and specified shades of one ink color side by side requiring the strip width for each combination of dot size and shade – one color after the other along the job width.

(3) The required width at the left and/or right side of the job for the specified strips inform about the reduction of the job width resulting from the current configuration.
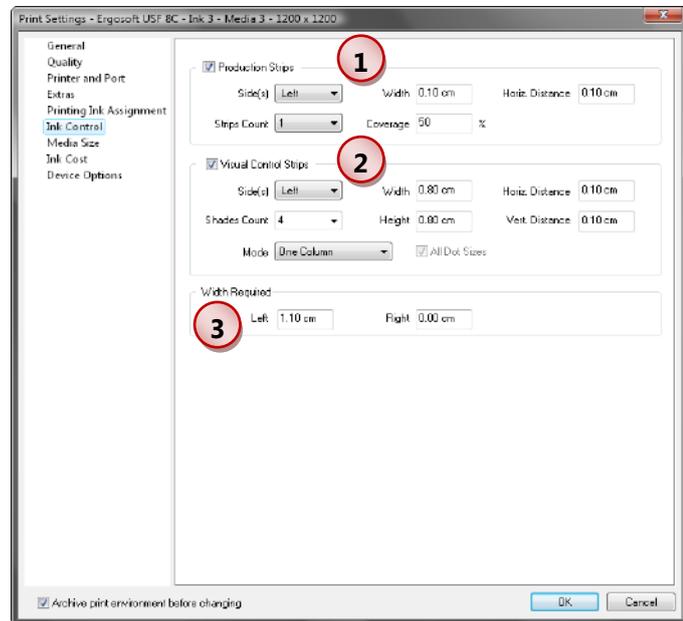
Tab "Media Size"

The **Media Size** tab allows setting a default media size for all jobs created with this print environment.

(1) Check **Use as default for this print environment** to specify a media format and margins that are always used as default when a new job is created for the current print environment.

    Please note that this setting will override the settings for the global media size for all jobs created when the current print environment is selected.

(2) Select the default **Media Size** for new jobs. The **Width** and **Height** of the selected format are displayed under the list. The **rotated** orientation can be selected if it is available for the selected format. When the selected printer allows checking the width of the inserted media you can also **get the media size from the printer.**

(3) Check **currently appropriate** to limit the list to those media that fit into the printable area of the current printer. Check **roll media only** to limit the media size list to roll formats only.

(4) Specify the **Margins** on the media that will not be printed. Mark **minimum** to use the minimum margins provided by the printer. **Borderless** is only activated when the current print driver (print environment) allows to print without margins for the selected media size.

(5) An unlimited number of media size lists can be saved (exported) and later reloaded. The button **Import** allows re-importing media sizes from the predefined System Files or another media size list (User Files) into the current list.

(6) Use the tool buttons to modify the media size list. This list is printer-independent which means that it holds all available media sizes independent whether they can be used with the current printer or not.

    Pre-defined media sizes installed with the **ErgoSoft RIP** cannot be modified in the settings. Media size "+Maximum+" cannot be modified at all nor deleted.
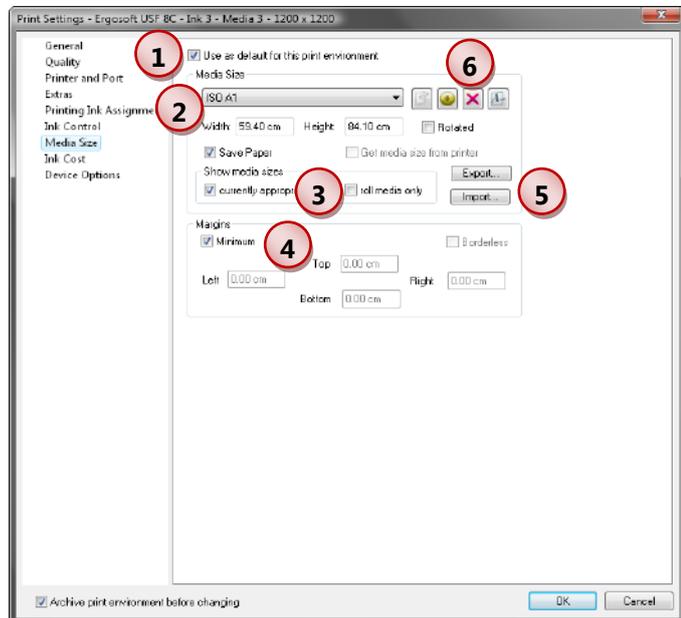
(7) Entering "0" for the width indicates the maximum width provided by the print driver. Entering "0" for the length indicates roll media.

Check **Save Paper** in order to cut the roll after the job length instead of after the specified media length. This option is only used by roll printers when sheet formats are specified.


Tab "Ink Cost"

The information on the **Ink Cost** tab is used to calculate the costs of a print. When the printer has variable dot, the dot volume can be set for each dot size.

(1) The **Default** dot volumes are set automatically and are not necessarily valid for your printer/ink.

Check **User,** double-click the volume to be modified, and enter the amount (in picoliter) of ink that is used for one dot. When using variable dots, the values for all dot sizes from big to small can be entered. When using fix dots, only one dot size "FixDot" is available.

(2) Select the **Ink Type** that is used in the current print environment. Clicking on the buttons allows the ink list to be edited by

- editing the selected ink type; e.g. specifying the cost factor for the ink
- adding new ink types to the list
- removing the selected ink type from the list
- renaming the selected ink type
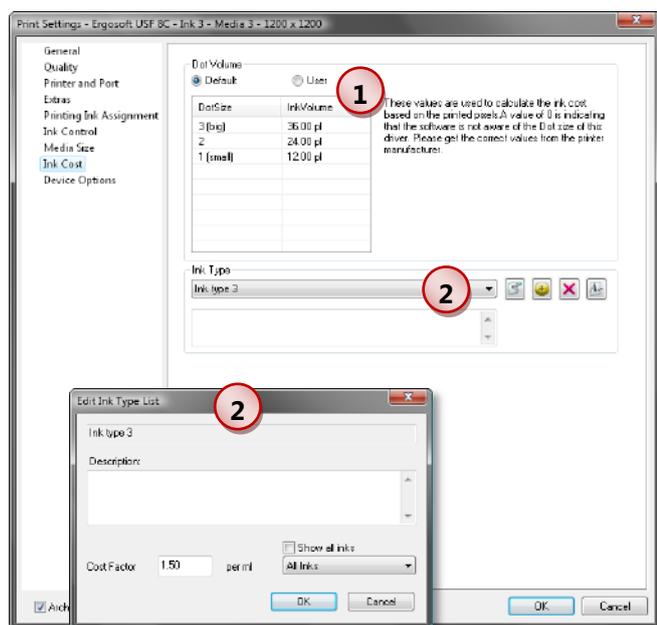
Tab "Device Options"

The **Device Options** tab allows choosing the device specific options you want to use. When using a predefined print environment please keep in mind that these settings will influence the quality of the final printout.

Depending on your printer these options allow to set the print direction, the number of passes, the dot size, the dry time, and many more.

Please note: When printing with an RGB print driver it is very important to select the appropriate media in order to get the expected output.

Tab "General"

The **General** tab contains general information like name and description of the print environment, specifications about the media for which these settings are suitable, as well as the model number when the printer can be purchased in different print widths.

① The **Name** and the **Description** of the current print environment can be modified.

When the basic printer for the current print environment had been supported in older versions of the **Ergo-Soft RIP, Use Legacy Driver** can be used to set the print environment format to the old version in which the new layout for the control strips is not available.

② The lower field in dialog part **Suitable media list for print environment** lists all media with which the current print environment is intended to be used.

As soon as a media is selected in this field, the button **Remove Media** is activated so that the media can be removed from the field.

As soon as a new media is selected in the list above, the button **Add Media** is activated so that this media can be entered into the field containing suitable media.

③ Clicking on the buttons allows the **Media** list to be edited by

- editing the selected medium; e.g. specifying the cost factor for the medium
- adding new media to the list
- removing the selected medium from the list
- renaming the selected medium

④ The **Print Data Type** just displays some information about basic print driver of the current print environment.

⑤ When the printer is available in several print widths, use the list **Printer Model** to specify the width of printer. This list is not displayed when there is only one width for the printer.
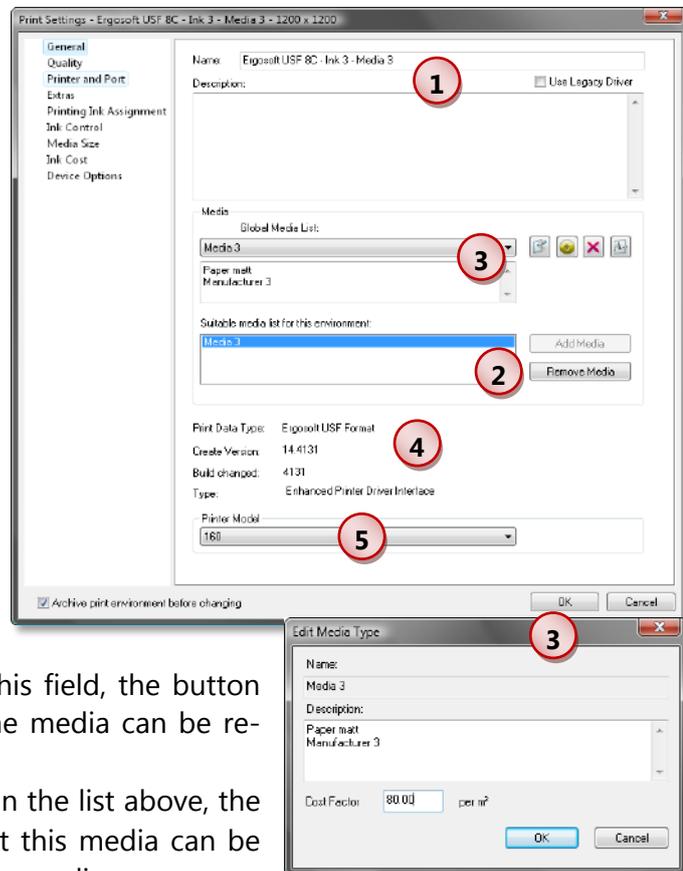
Tab "Extras"

The **Extras** tab allows some additional settings to be specified.

(1) The **Legacy Ink Control Strip** is only available for legacy print drivers (see tab General). It is printed at the left side of the job when it is **Enabled.** It takes care that each cartridge is used either in fixed intervals **(alternating)** or as continuous strip of all colors side by side **(continuous)** so that the ink cannot dry up and that it can be seen when a cartridge stops working.

Use **Width** and **Height** to specify the dimensions of the ink control strip samples. **Horizontal** distance is responsible for the distance between the ink control strip and job. **Vertical** distance is responsible for the distance between the samples in the ink control strip.
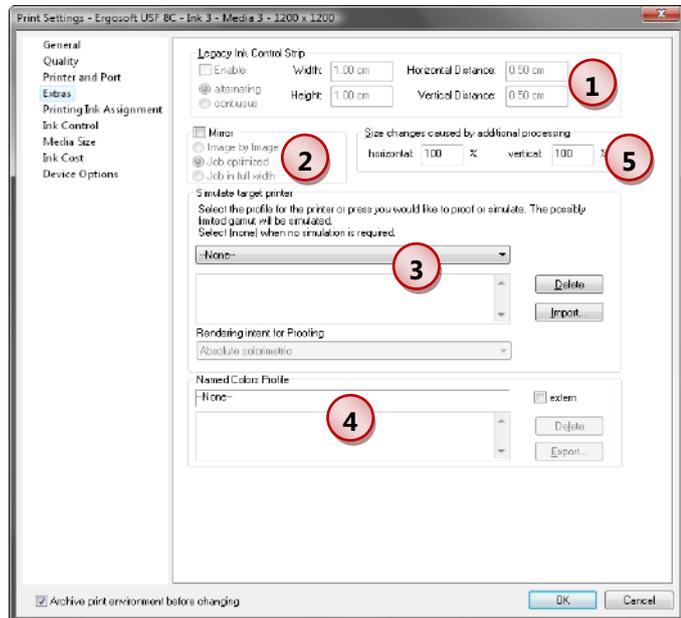
(2) Specify in the dialog part **Mirror** whether or not all images in the job are to be mirrored at the vertical axis. You can either mirror **Image by Image** where only the images are mirrored but the order of the images from left to right is not touched. Or you can mirror the complete job either in full width including the white space at the right side **(Job in full width)** or without the white space at the right side **(Job optimized)** where not only the images are mirror but also the order of the images from left to right is reversed.

(3) Select an output profile that is to be used to simulate a target printer (e.g. offset printer, not supported large format printer, etc.) during printing with the **ErgoSoft RIP** color management. When printing, the image data are first converted into the gamut of the proof printer using the profile and rendering intent that was specified on this tab. Then these converted data are converted into the gamut of the printer that is used for the printout.

(4) The **Named Colors Profile** is a list of color names and color values that is used to replace colors in an image.
For information about creating and using a named colors profile please refer to the manual part about Color Replacement.

(5) When certain media is used, the size is changed caused by additional processing. Use the dialog part **Size changes caused by additional processing** to specify the horizontal and vertical change to consider it automatically during printing. The value to be entered is the size of the printed image in relation to the image size in the job. Thus, entering a value greater than 100% causes the images to be printed smaller, entering a value smaller than 100% causes the images to be printed larger.