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Troubleshoot Image Quality issues

Colors shift unexpectedly

In certain colors and applications a certain amount of color shift can be observed especially between the right and left edge of an image. To prevent this use the following options:

How to avoid Color Inconsistency

In order to ensure overall Print Quality and in particular Color Consistency, is at an acceptable level check the following:


1. Make sure that all the calibrations below have been performed with good results:
 - a. **Printhead Alignment:** Ensures color to color alignment and bidirectional alignment within a color.
 - b. **Media Advance Calibration:** Check and corrects potential color plane misregistrations in the paper axis.
 - c. **Color Calibration (CLC):** Ensures linear tonal response as well as consistency between different printheads and printers. A separate Color Calibration is advised for each media but also when any given printhead is changed. To get an even better performance we recommend performing the Color Calibration frequently, depending on the printer's usage it can be scheduled weekly, every two weeks or longer according to your work flow.
 - d. **Dynamic Color Correction:** Corrects the color plane misregistration that can be caused by the substrate deforming under heat.
2. Use of Bidirectional printmodes to minimize the tonal differences between the end and beginning of a swath.
3. Higher pass printmodes, cause lower stress to the printhead and thus less related tonal differences.
4. Use of Spitbars: Usage of spitbars at plot sides. Spitbars are provided within IPS, they help with startup problems by preparing the printhead for printing a job. It should be noted the Spit bars available within some RIP application do not include bars of light colors.

The Spit bars have to be added at the side of the plot vertically, parallel with the edge of the substrate, towards the cartridge side (they can also be added on the other side, but this reduces the impact they make). To add Spit Bars use the following procedure:

- a. Select nesting from the IPS PC.
- b. Add the following file situated in the IPS PC in Documents\HP IPS\Spit Bars .
- c. Select the Spit Bar at the same resolution as the job to print, and place the Spit Bar on the right of the image on the IPS (this will then be printed on the left part, towards the cartridge).

Another method is to Adding the spit bars within the RIP application, nesting them with the plot to print. The spit bar file to take is available on the IPS PC, under: Documents\HP IPS\Spit Bars, take

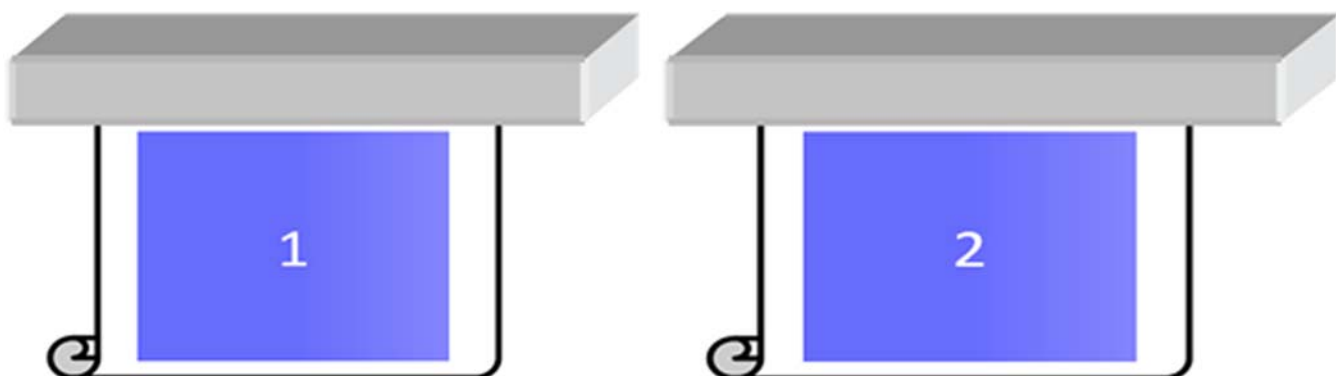
the file 'spitBars_300_HR_1.TIFF'. Do NOT use the default spit bars from the RIP (accessible usually by just checking a box 'spit bars' as it will not print any Light Cyan, or Light magenta.

 **NOTE:** The recommended width of the Spit Bars is 3.5 cm (approximately 1.4").

Recommended course of action (In all cases a Printhead Alignment and Media Advance Calibration are recommended)					
Issue	Bidirectional	Plot rotation/ Smart nesting	Spitbars	Color Calibration	Dynamic Color Correction
Color Misregistration					X
Left-Right Difference	X	X	X		
Neighboring area fill dependence	X				
Plot to Plot		X		X	
Printer to printer				X	
Startup			X		

When printing using the tiling option

When printing a job which consists of a solid color area fill (no gradient) and using the tiling feature to print the job as two or more tiles. The diagrams below show the appearance of the two printed tiles, with the color shift greatly exaggerated to better illustrate the problem.



When looking at each individual tile, the eye doesn't see anything. However when the two tiles are joined, the eye can see a difference in the colors:

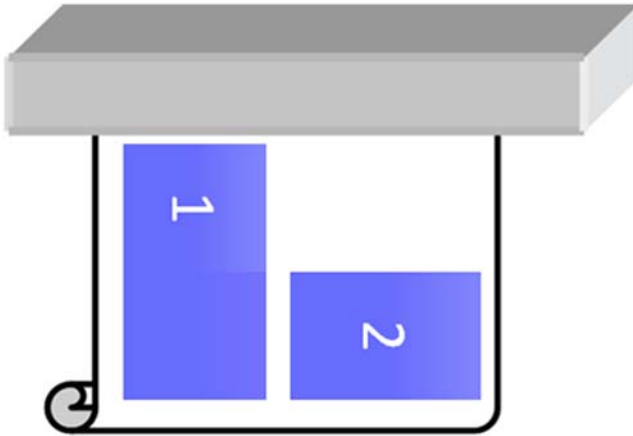


If the second tile is rotated, the eye does not see the color difference anymore. Refer to the User's Guide for the details on how to rotate an image using the HP Internal Printer Server.

When performing 'Nesting'

In some very extreme and specific cases, depending on how the plots are organized, you might see a color difference within one area fill, while there is no color difference within the original job.

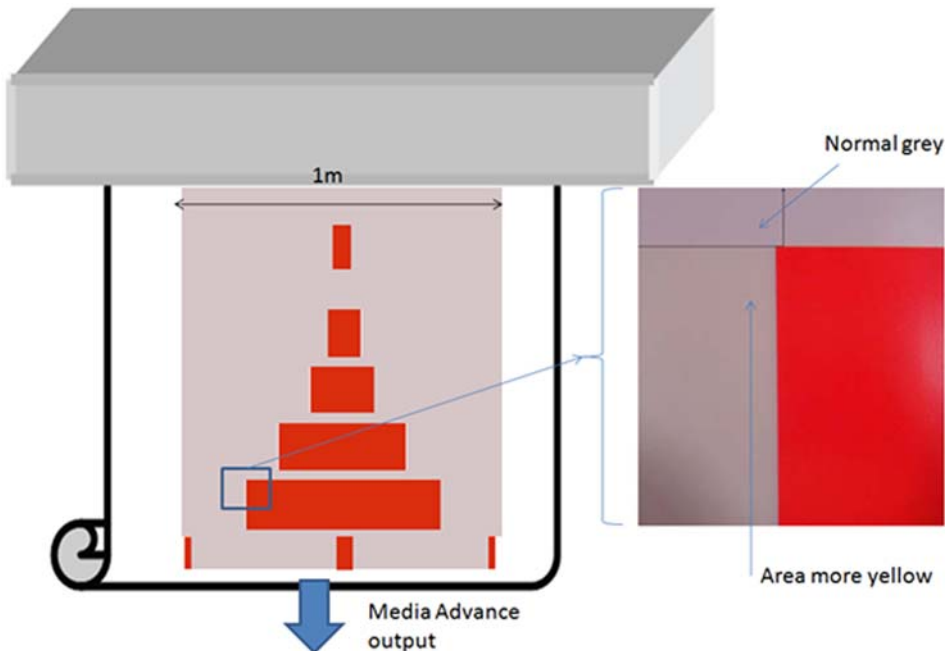
Here is an example of two plots nested:



To solve the issue so that you cannot see the color shift in the middle of the job 1, you can reorganize the nesting (or do not do nesting).

Neighboring area fill dependence

Here is an example of job where a slight variation of color is visible:



Mainly when printing in Unidirectional, the light gray area on the left of the bigger red rectangle is showing a little more yellow. When the red rectangle is smaller, this effect is no longer visible. When printing in bidirectional, the effect is also less visible.

When printing area fills on some substrates

The following issue can be seen when printing some specific area fills on some substrates which are prone to a higher level of shrinkage (or when the dynamic color registration calibration is not optimized).

In this case, the relative positions of the dots of inks, between Yellow/magenta and Cyan/black can be completely different towards the edge of the substrate compared to the middle of the substrate. When

this occurs and when printing a large area fill of mainly a single color, a color shift can be seen between the middle of the substrate and the side of the substrate. This could also happen when the advance is not perfect, but in this case, horizontal banding should be visible.

To solve this, perform the best Dynamic Color Registration you can achieve refer to the Service Manual.

Blurred or defective areas on edges or lines

When printing in bidirectional, in some cases, the beginning of the text and the area fills could be lacking in sharpness on the edge area of the substrate on the cartridges side, not as sharp as the sections on the side of the cabinet/HP Internal Printer Server PC. In order to reduce this effect, some 'spit bars' can be added on the edge, towards the cartridge side. There are two ways to add them:

- Select nesting from the HP Internal Printer Server, adding the following file located under: C:\Users\windows Login\Documents\HP IPS\Spit Bars, select the spit bar of the same resolution as the job to print, and place the spit bar on the right of the image on the IPS (this will then be printed on the left part, towards the cartridge)
- Adding it on the RIP, take from the HP Internal Printer Server, the right spit bars to print, available under: C:\Users\windows Login\Documents\HP IPS\Spit Bars, take a file ending by 'HR_1.tif' Do NOT use the default spit bars from the RIP as it will not print any bars with Light Cyan, or Light magenta.

 **NOTE:** Width of the recommended spit bars is 3.5 cm (1.4")

How to achieve better consistency between jobs of the same length

How to reduce as much as possible the length variability between jobs of the same length.

1. Select a substrate which is less susceptible to media expansion when being printed on. Most paper based media, such as the HP photorealistic or offset media, have a tendency to expand.
 - In case you still have to print on media susceptible to media expansion:
 - Ensure that the density of ink is similar between each tile (if not, the tile with less ink might be shorter).
 - If possible increase the heating temperature.
 - Reduce as much as possible the ink restrictions.
 - Make sure that the roll is left within the room where the printer is located for at least 24h, this is to ensure the complete roll is has the same temperature as the printer.
2. DO NOT TOUCH the Print Adjustments (no change of media advance compensation).
3. Print all the tiles at once.
 - Do not split the jobs at different times (1 tile one day, and the 2nd tile the 2nd day)
 - Do NOT change the printmode or the media width between tiles.

To print the tiles all at once, we recommend the following:

- a. Create the tiles from the HP Internal Printer Server (IPS).
- b. If you are creating the tiles from the RIP, ensure that you send all the tiles within the same jobs sent to the printer/HP Internal Printer Server.

The objective is to make sure that there is no pause between the tiles. When using the Queue mode in the HP Internal Printer Server, there is still a small time between the jobs, which could add more variability between the lengths of the tiles.

4. In order to make sure that even the first tile has the less difference of length versus the other ones, add a top margin of 50 cm.

In case you have to reprint one tile, in order to ensure the length will be as close as the previous jobs:

- Make sure that the substrate and also the ambient temperature of the printer are the same as when the previous job was printed
- Add a top margin of 50 cm

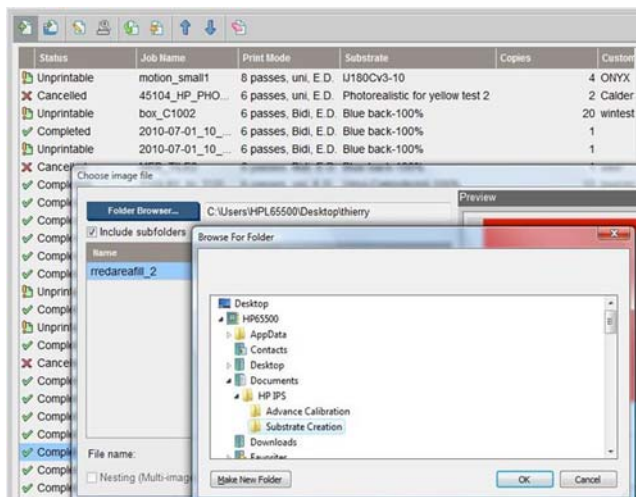
But in any case, when having to reprint a tile later, there is a higher probability that the length will be different compared to the other tile length. The total length repeatability depends on the substrate, and the contents of each job (mainly when the substrate is reacting differently depending of the ink density).

How to fine-tune and check the printer configuration (in case of color mis-registration):

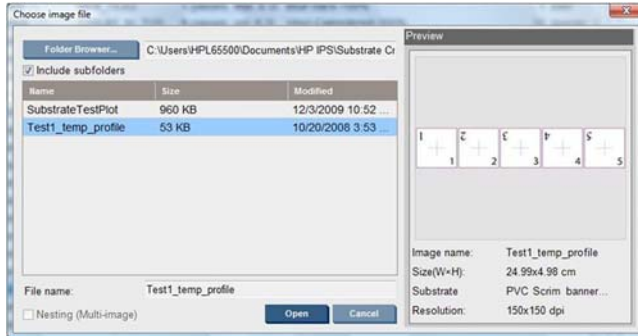
A series of crosses can be printed on the full width of the substrate for one meter and then the calibration can be done 'on the fly' through the Print Adjustment button.

Make sure that the Printheads are aligned. To do this print the Printhead alignment check (printer -> Printhead alignment -> Verify alignment and click on print, (refer to the maintenance and troubleshooting guide). If required, perform the Printhead alignment and recheck that the Printheads are aligned.

1. Browse to the following directory: C:/users/currentlogin/Documents/HP IPS/Substrate Creation.



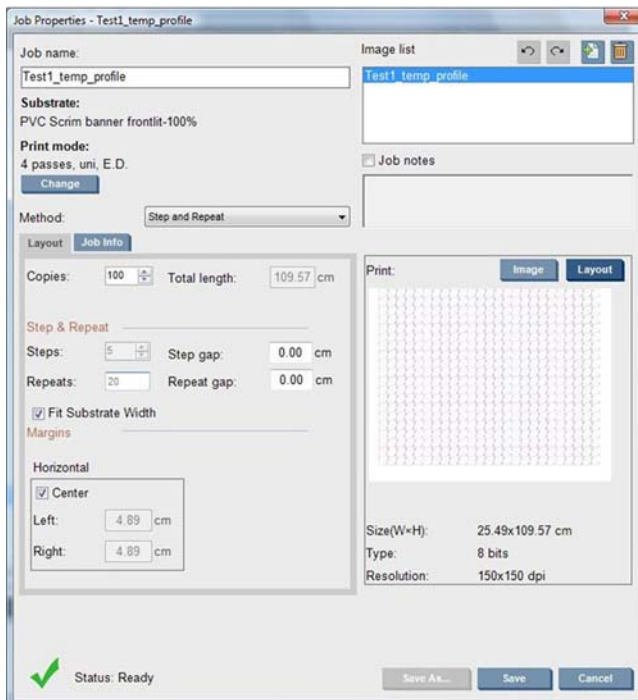
2. Select the file 'Test1_temp_profile'.



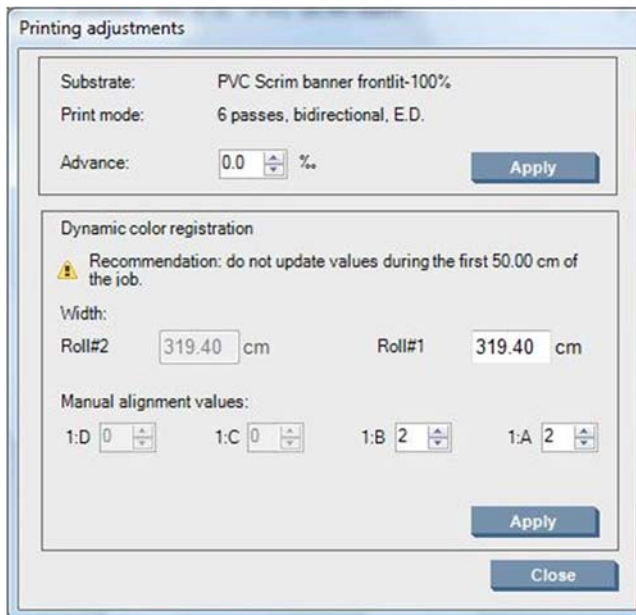
3. Click on Open and set the following settings on this job:

- Set the printmode to the one that you plan to use, set also the correct substrate preset that you want to print on.
- In **Method**, select **Step and Repeat**.
- Check **Fit Substrate width**.
- Check **Center**.
- Increase the copies to reach a total length to print of at least 1 meters (40”).

Here is an example:



4. Select print and through the **Print Adjustment** button, change the advance and dynamic color registration while printing, wait for 50 cm to be printed to be sure the printer has reached a stable phase (the first 50 cm can still be miss-aligned through the media advance or scan axis).



5. Use the following procedure to perform the fine tune:

a. Advance: By checking the horizontal lines:

- If you see magenta above the black/cyan lines, increase the substrate-advance setting.
- If you see magenta below the black/cyan lines, decrease the substrate-advance setting. Click on Apply.



NOTE: Important notes when using the new calibration plot:

Certain types of media can sometimes skew in the paper path, which causes the calibration to drift overtime. When loading the media for the calibration make sure that the media is loaded correctly and check that there is no skew. If necessary recalibrate when needed.

Some media types deform under temperature more than others, with certain types of media the amount of deformation is too much and the calibration functionality in the printer cannot compensate (A or B over 30 or below -30).

It is important to note that when using 8 pass unidirectional printmode with the 100% density media category the correcting capability is half compared to any other printmode.

- b. Color Registration:** By checking the vertical lines from the output. The A value affects printing on the right-hand side of the substrate, while the B value affects printing on the left-hand side. Increasing the value moves magenta to the left, decreasing it moves magenta to the right, and click on Apply

The calibration (color registration) will be visible after a certain length of substrate has been printed. The length will depend on the print mode. Examples:

- With a 2-pass print mode, about 1 m (40 in) of substrate will be printed before the calibration takes effect.
- With a 4-pass print mode, about 0.5 m (20 in) of substrate will be printed before the calibration takes effect.
- With an 8-pass print mode, about 0.25 m (10 in) of substrate will be printed before the calibration takes effect.

Which calibrations are specific to a certain substrate preset or printmode

Some calibrations that the printer performs are specific to the substrate that was loaded at the time the calibration was performed and some are not. The calibrations that are specific to the loaded substrate must be performed again if the substrate is changed. Shown below are the calibrations showing which ones are specific to the substrate loaded and which ones are not.

- **Printhead Alignment:** This calibration is applied to all presets and printmodes. Usually, when switching from one substrate to another, there is no need to redo this calibration, however if printing in bidirectional where the variation in thickness of the substrate could impact the bidirectional alignment, then the calibration would need to be performed again.
- **Dynamic Color Registration:** This calibration is defined per substrate preset. It should also be noted that when changing from one printmode to another the printing behavior of the substrate may change, there may be increased contraction for example, also if the heating and curing temperatures, air flow are changed. In these cases it is better to create two separate substrate presets, with the different printmodes,
- **Substrate Advance Compensation:** This calibration is specific per preset substrate per printmode. When changing from one printmode to another (even from uni to bidi), the Media Advance Calibration must be performed again. The ED and GN share the same media advance calibration.
- **Color Calibration:** This calibration is per substrate preset.