Print Quality 6

Print Quality

Print Quality Troubleshooting Checklist

When faced with an Print Quality problem, use the following checklist as a guide in troubleshooting the problem:

1. Problem reproduction
   - Reproduce the problem that the customer is seeing using their original settings.
2. Printer configuration:
   - Print Mode: Set to "Best" (in the printer and in the drivers).
   - Dry time: Set to "Automatic".
   - Select the correct media setting when loading the media.
3. Hardware check list

   Firmware Revision
   - Check if the latest version of the firmware is installed. If not Install the latest firmware revision. Refer to Chapter 7 for the part number of the Flash SIMM.
4. Printheads

   Printhead Troubleshooting Process:
   - If you don't have any samples yet, reproduce the original problem with the correct printer settings.
   - Print the Print Quality Test using the exact settings and Media that the Customer used when faced with the Print Quality problem

   Printhead Alignment and Check:
   - Perform the Printhead Alignment using HP High-Gloss Photo Paper. If not available, use Coated media if required.
5. Media
   - Make sure that you use HP or HP-approved media.
   - Select the correct media type through the front-panel when loading it.
6. Driver print quality configuration:

   To clarify if the reason of the problem is related with the print mode defined with the Non-HP Driver try the following:
   - Print the same sample using the Non-HP driver and their normal media.
   - Print one of the internal demos or print the Print Quality Test using HP Media and configuring the printer as indicated previously.
   - If the output obtained using the HP Solution is good and the one obtained through the 3rd party solution is bad, HP support organization should:
   - Communicate to the customer that the problem is not in the printer and that he should address it through the 3rd party vendor support structure.

7 Service Accuracy Calibration

- Perform "Service Accuracy calibration" using HP High-Gloss Photo Paper.

Do NOT use any other type of media apart from HP High Gloss Photo Paper when performing the Accuracy Calibration.

Print Modes

The Printers have a large number of print modes. A print mode specifies how to interpret and put on media a set of bitmap planes, each of which consists of a sequence of rows. Each mode corresponds to a unique combination of the following parameters:

- Print resolution (300 dpi, 600 dpi, 1200 x 600 addressable).
- Number of passes per advance.
- Number of advances per swath.
- Print direction (bidirectional).
- Carriage speed.
- Smart Area Fill (SAF).
- Print masks.
- Servicing states.
- Multiple dotting (K).

User input to print mode selection consists of the following:

- Choice of media type.
- Choice of print-quality setting (fast, normal, best).
- The language in which the file is received.
- The model of printer used.
- The type of driver (HP or Non-HP).

How to Use the Print Quality Test

What is the Print Quality Test?

The Printer contains an internal Print Quality Test which helps you to diagnose the possible source of any print quality defects. The Print Quality Test is divided into three parts:

a Nozzle print test, designed to check if the printhead nozzles print correctly.

b Color alignment test, designed to check any color-to-color misalignment the printer may have.

c Overall print quality in **BEST** mode, specifically designed to diagnose banding problems in high density areas.

Considerations for Printing the Print Quality Test.

1 The Print Quality Test prints in A3 and B sizes so you must have media loaded (roll or sheet) that is this size or larger.

2 Use the same type of media that the customer was using when they found the print quality problem.

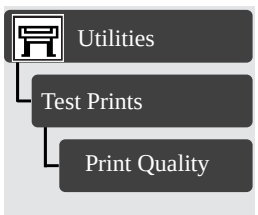
3 If the customer is using non-HP media and after the Print Quality Test you still have the same print quality problems, change to genuine HP media and repeat the Print Quality Test.

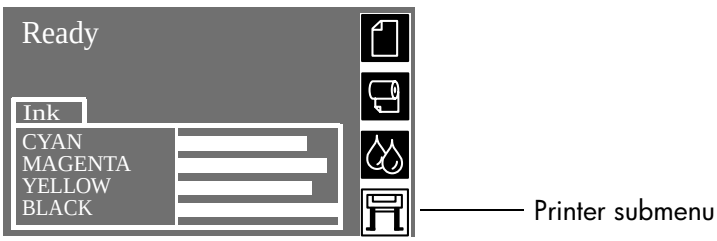
4 If you do not see any problems with the Print Quality Test, then the problem may not be with the printer itself. The problem may be with the RIP or the driver for example.

However if you do see problems with the Print Quality Test then continue with the following procedures which will help you to diagnose the problem.

Printing the Print Quality Test

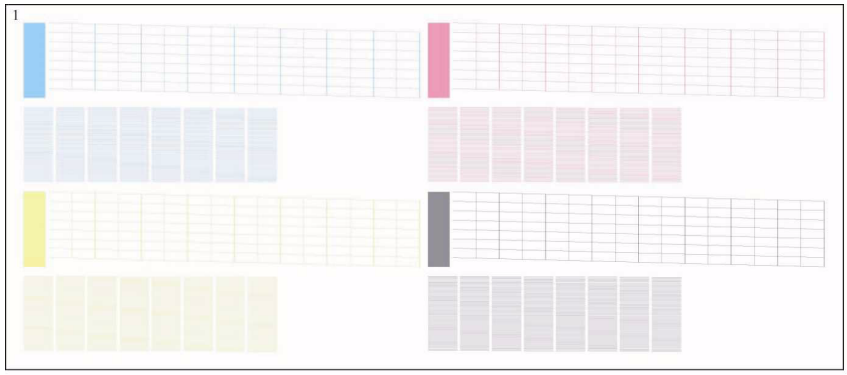
1 Go to the printer submenu and press **Enter**.

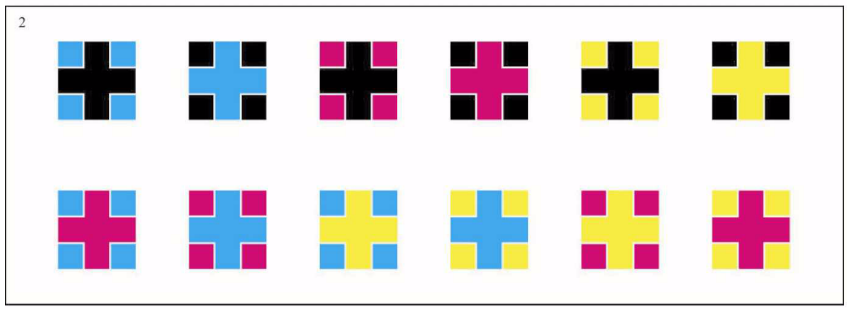


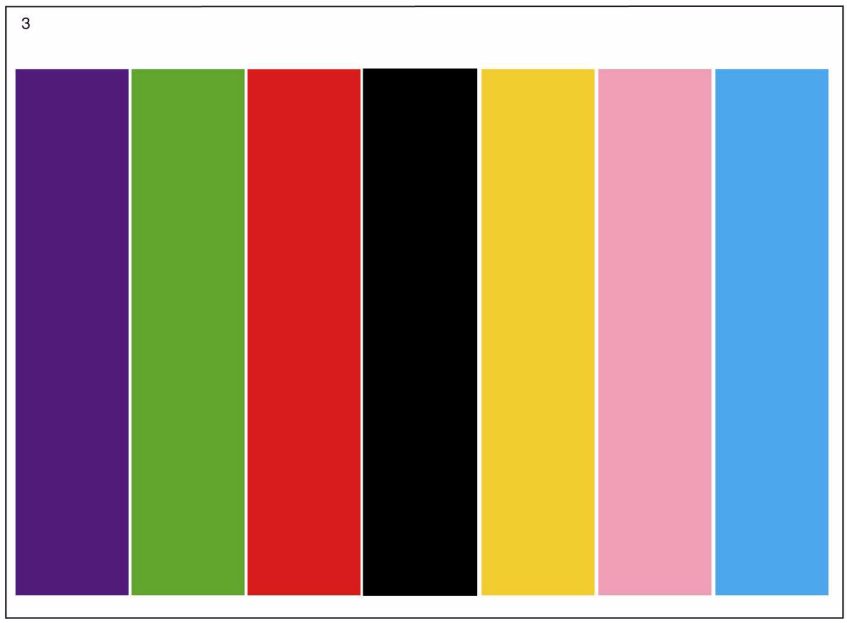


2 Select Print Quality from the Utilities/Test Prints menu, then press **Enter** to print the test.

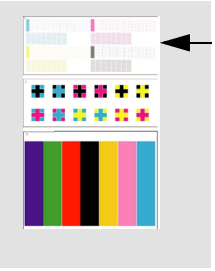
The printer will print out a series of patterns (shown below):





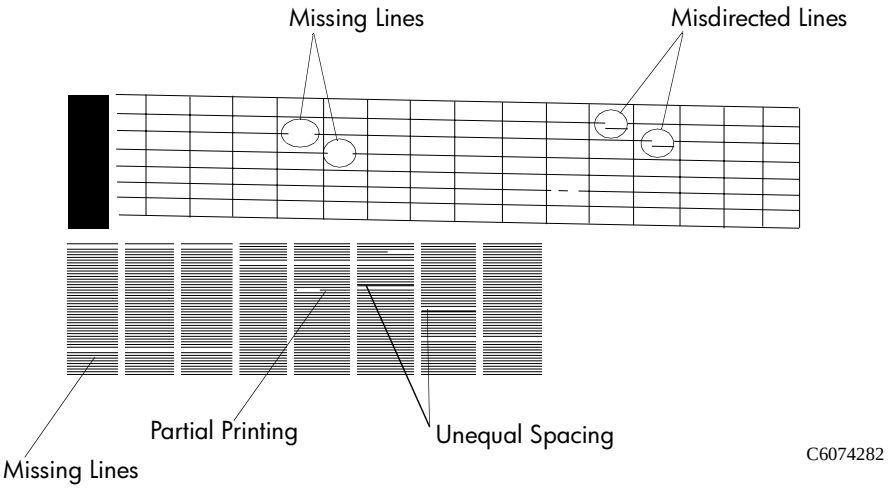


Nozzle Print Test



The nozzle print test is located on the Print Quality Test in the top section. In this test the 512 nozzles that each printhead uses to print with are tested.

This is what you would see if there are nozzles not printing correctly:

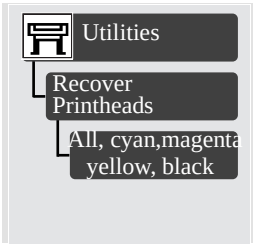


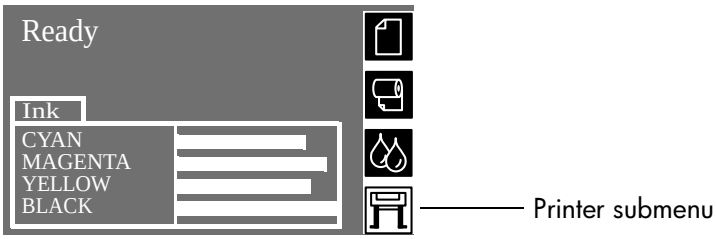
1. In the top pattern of the Print Quality Test, there is a series of stepped diagonal lines. If one or more of the nozzles are malfunctioning or mis-positioned, you will see that the stepped lines are broken or misdirected in one or more places.
2. Below the top pattern on the Print Quality Test, there is a series of horizontal straight lines. If one or more nozzles are misdirected there will be unequal spaces between the corresponding lines.

How to fix the Nozzle Defects

If your printer has nozzle defects, it does not mean that you will not get perfect print quality results. The printer has automatic procedures to hide many nozzle defects. This type of problem affects mostly Normal and Draft modes.

1. Go to the Printer submenu and press **Enter.**





2. Go to the Utilities/Recover Printheads.
3. Select the printhead color that is responsible for the problem. The printer will try to 'Recover' the defective printhead. If you are not sure which printhead

color is giving you the problem select all of the printheads. Please wait as the process of recovery takes a few minutes.

4 Reprint the Print Quality Test to check that the defective nozzles have been corrected.

5 If the error is still present, replace the worst printheads.

Color Alignment Print Test

This part of the Print Quality Test is designed to check the color alignment. It produces twelve patterns each with two different primary colors. In each pattern you will see a cross surrounded by another color. If there is misalignment between the colors there will be inconsistent spacing between the cross and the other color.

There are two types of misalignment:

- Horizontal - when the misalignment is in the horizontal axis.
- Vertical - when the misalignment is in the vertical axis.

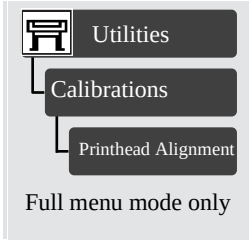
Below are shown two examples of alignment and misalignment:

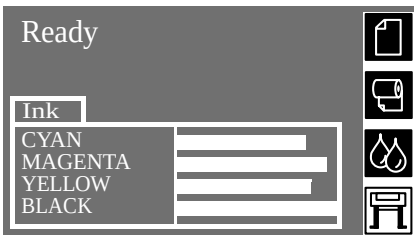
Correct Incorrect

Solving the Color Alignment Problem

1 Make sure you have media loaded (not clear film, vellum or tracing paper).

2 Go to the printer submenu and press **Enter.**





3 Perform the Printhead Alignment Calibration by going to Utilities/ Calibration/Printhead Alignment. Please wait as the process of aligning the printheads takes a few minutes.

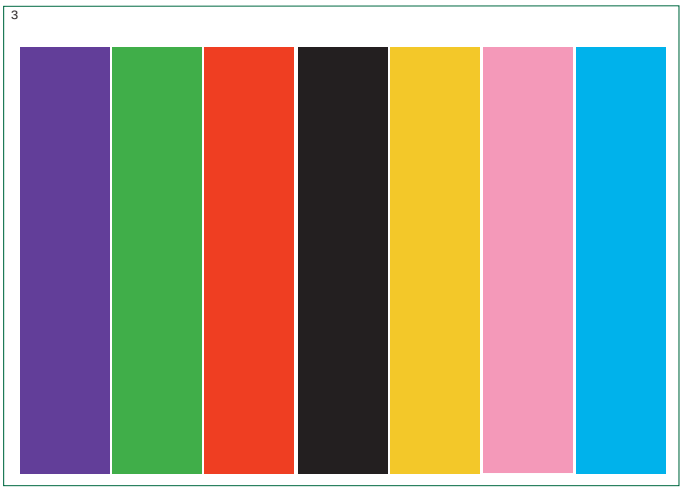
4 Reprint the image you were attempting to print before (in the same mode) to see if the problem still exists.

5 Perform the Color to Color Calibration ⇒ Page *5-16*.

Overall Print Quality Test in BEST mode

Blue, Green, Red, Black, Yellow, Magenta, Cyan Test

This test pattern checks performance for banding in **Best** mode only for the media you are using.



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What is Banding?

Banding is when you see repetitive horizontal bands within your printed image (these may appear as light or dark bands).

The test pattern is printed with four primary colors; black, cyan, magenta and yellow. The three secondary colors printed are red, blue and green and they are formed by mixing the primary colors as shown in the table below:

Secondary Color	Primary Color Components
Red (R)	Magenta (M) and Yellow (Y)
Blue (B)	Magenta (M) and Cyan (C)
Green (G)	Cyan (C) and Yellow (Y)

Solving the Banding Problem

There main causes of banding:

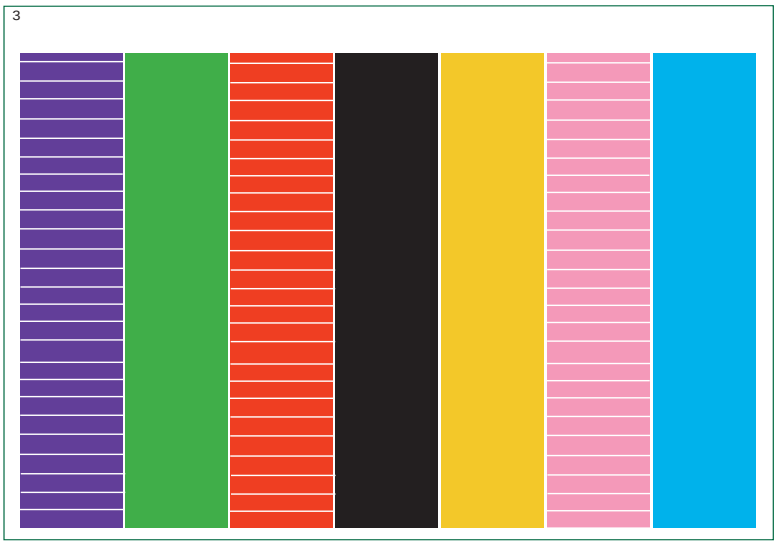
- Printhead problems *(see below)*.
- Use of Non-HP media
- Incorrect media type selected in the front panel.
- Media advance problems.

Banding Caused by Printhead Problems

In this case you will see banding in only a few colors.

If the test pattern has clear or dark horizontal bands in one or more of the primary color columns, then several of the secondary color columns will also have the same type of bands in the same position (but perhaps with less intensity).

In the following example, several nozzles in the magenta printhead are not printing. There will be clear repetitive bands (perhaps white) in the magenta column. Consequently, you will see lower intensity bands in the same print position in the red (which is Magenta + Yellow) and blue (which is Magenta + Cyan) of the secondary color columns.



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1. The bands could be caused by the nozzles not printing correctly. You can check the health of the nozzles by performing the Nozzle Print Test.
2. The light or dark horizontal lines could also be caused by permanently damaged printheads. The possible combinations with this problem are:
   - Banding in **cyan**, **blue** and **green** columns only, but more evident in cyan. This means that the cyan printhead could be permanently damaged.
   - Banding in **magenta**, **red** and **blue** columns only, but more evident in magenta. This means that the magenta printhead could be permanently damaged.

- Banding in **yellow**, **red** and **green** columns only, but more evident in yellow. This means that the yellow printhead could be permanently damaged.
- Banding in **black** column only. This means that the black printhead could be permanently damaged.

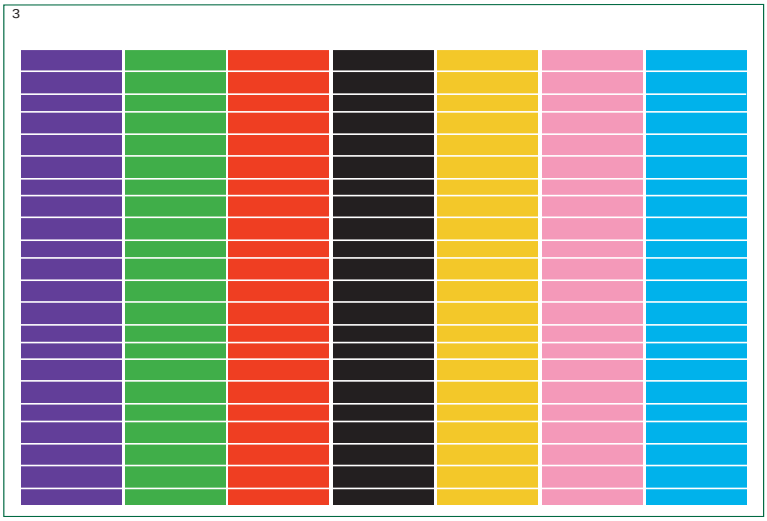
If you want the best high quality image from your printer, replace the damaged printhead with a new one.

However, your printer can still produce good quality line prints.

Banding Caused by Media Advance Problems

Another type of banding is caused by an inaccurate media advance in this case there will be banding (horizontal repetitive bands along the test pattern) in **all** the primary and secondary color columns.

The bands can appear as dark bands, due to a shorter advance of the roller which causes an overlap, or lighter bands due to a longer advance causing spaces.



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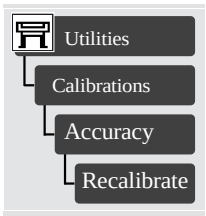
Banding in all of the colors

1. Make sure that the media selection made in the front panel is the same as the media that you have loaded.

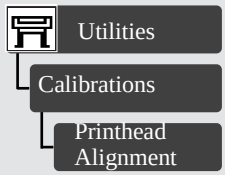


2. It is possible that the banding was caused because the customer was using non-HP media. If the customer still wants to use non-HP media, recalibrate the paper accuracy by performing the accuracy calibration. Performing this will overwrite the default setting for **only** the paper that you have selected.

If the customer wants to use HP certified paper at a later stage, they can restore the optimal setting to what it was by going to Utilities/Calibration/Accuracy/Restore Factory.

3. Perform the printheads alignment procedure.

Aligning the Printheads



Full menu mode only

The printhead alignment selection causes the printer to align the printheads immediately, or if an image is being printed, as soon as the current print job is finished. The alignment procedure requires a minimum paper size of A2 or C-size.

The printer will automatically perform an alignment when printheads are replaced. You can use this feature if the Print Quality Print indicates an alignment error.

You should not attempt to align the printheads with tracing paper, vellum or clear film.

Service Accuracy Calibration

If the banding problem remains after using HP Media and trying the above steps to resolve the problem, perform the Service Accuracy Calibration ⇒ Page *5-6*.

Troubleshooting Print Quality Problems

Problems with Stepped Lines

Description of problem

When you look at the image you have printed there are **'stepped lines'** in the borders of arrows and diagonal lines. The lines should be straight with no stepping.

Shown below is an example of what you might see if you have problems with Stepped Lines.

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How to solve the problem

1. Increase the dpi setting by changing the print quality to best in the front panel and driver software.
2. The problems may be inherent in the image you are trying to print. Try to improve the image with the **application** that generated the file.

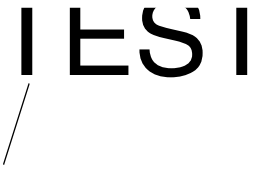
Problems with printing lines

Description of problem

When you look at the image you have printed there are:

- Missing or faint lines
- Printed text having missing parts to them.

Shown below are examples of what you might see if you have problems with printing lines.



Missing parts of text; this should say TEST

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Straight lines have missing sections

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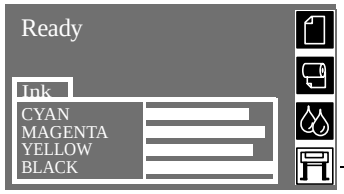
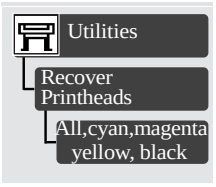
How to solve the problem

1 Go to the printer submenu and press **Enter.**





2 Go to Utilities/Recover Printheads.

3 Select the printhead color which has the problem. The printer will try to 'Recover' the defective printhead. If you are not sure which printhead color is giving you the problem, select all of the printheads. Please wait while printer tries to recover the printheads.

4 **Reprint** the image you were attempting to print before (in the same mode) to see if the problem still exists.

5 If the problem continue, reprint the image using **Best** mode.

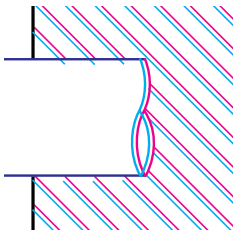
6 If printing in Best mode is not acceptable, replace the offending printheads. If you're not sure which printhead is giving you the problem, print out the Print Quality Test. This will help you find the faulty printhead.

Problems with Color-to-Color Alignment

Description of problem

When you look at the image you have printed:

- The colored lines are printing double and they are the wrong colors,



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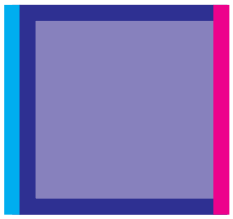
- The borders of colored blocks are overlapped and the overlapping areas have different colors in them.



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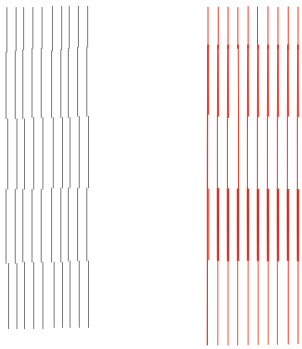
- Vertical lines are mis-aligned or fuzzy (not smooth)



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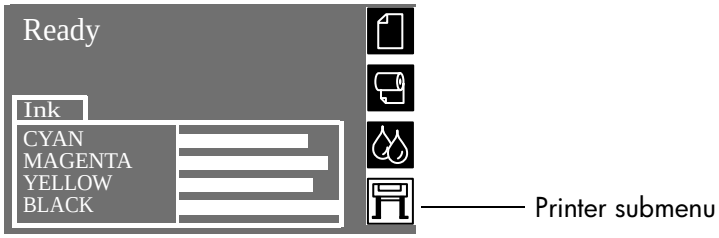
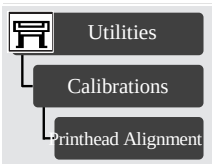
How to solve the problem

1 Make sure you have paper loaded (not clear film, tracing paper or vellum).

2 Go to the Printer submenu and press **Enter.**





3 Perform the Printhead Alignment Calibration by going to Utilities/ Calibration/Printhead Alignment. Please wait as the process of aligning the printheads takes a few minutes.

4 Reprint the image you were attempting to print before (in the same mode) to see if the problem still exists.

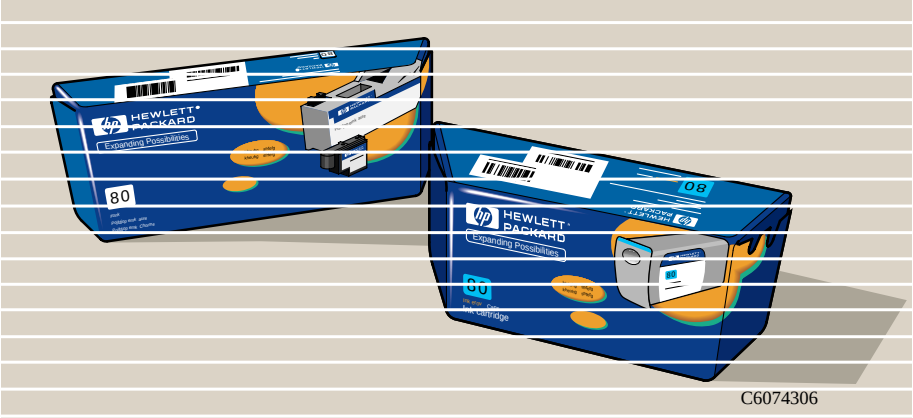
Problems with Horizontal Lines (Banding)

Description of problem

When you look at the image you have printed there are light or dark lines on the image, these are particularly highlighted in high density ink areas. This problem is known as banding.

Banding can occur to a certain degree in draft and normal mode when printing high density prints. To obtain the best image always print in Best Mode.

Shown below is an example of what you might see if you have problems with banding.

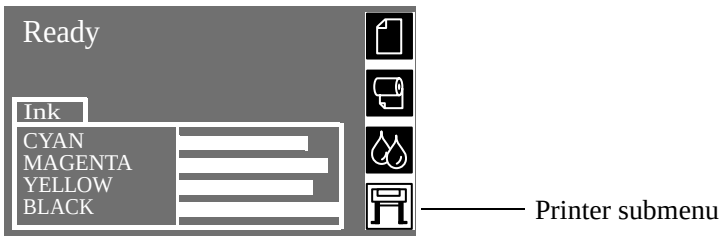


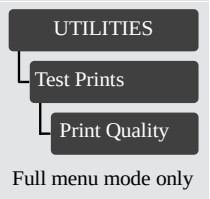
How to solve the problem

While performing the next procedure, duplicate the condition the printer was in when you discovered the problem: use the same media and the same print mode.

1. Ensure that the paper you have selected in the front panel is the same paper that you have loaded.
2. Perform the Printhead Alignment Calibration.
3. Reprint your image.
4. If you have printed your image in Normal or Draft mode and it is not acceptable to you, re-print it in Best mode. Check the front panel and driver selection to make sure that Best mode is selected.

5 Go to the printer submenu and press **Enter**.

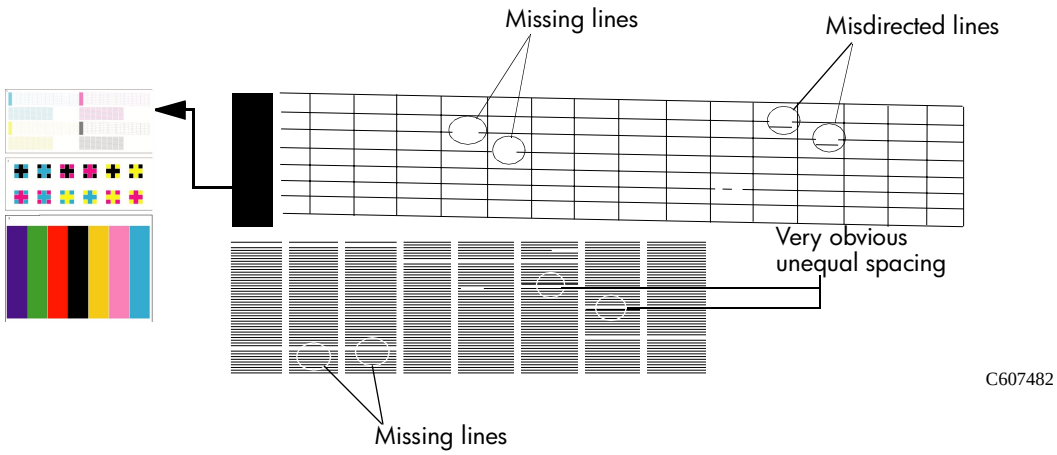




6 Go to Utilities/Test Prints/Print Quality and press **Enter.**

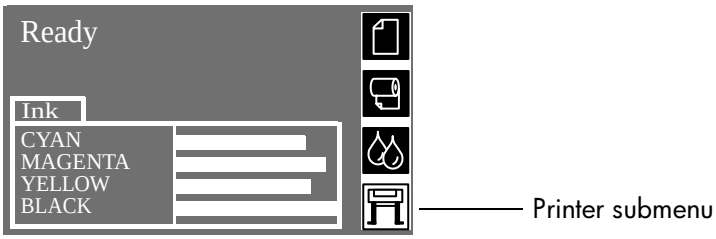
7 The printer will print a diagnostic test print. This will help you find the source of the banding problem. Please wait as the process of printing the Print Quality Test print takes a few minutes.

8 Look in the **top** section of your Print Quality Test. Check to see if there are any of the following examples of defects in the print.



9 If there are any of the above defects visible in the test print, continue with step 9a. If there are no defects in the top part of the print test, go to directly to step 10.

a Go to the printer submenu and press **Enter.**



b Go to the Utilities/Recover Printheads and press **Enter**

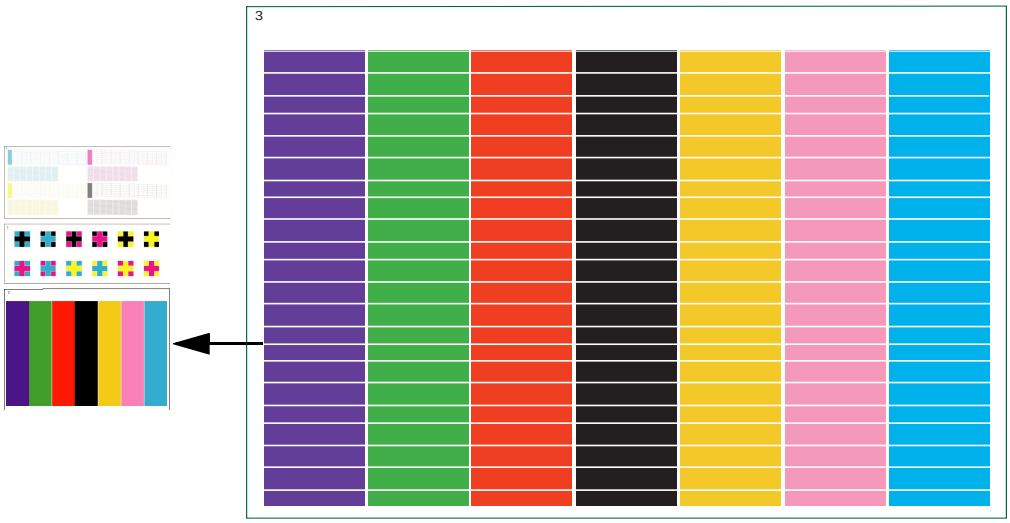
c Select the printhead color that displayed the defects in the Print Quality Test. If you are not sure which printhead color is giving you the problem select all of the printheads.

d Perform the printhead alignment procedure.

e Reprint the image you were attempting to print before (in the same mode) to see if the problem still exists.

f If there is no improvement in the quality of your image, print the Print Quality Test again and continue to the next step.

10 Check the **bottom** section of the Print Quality Test. If there is banding in **all** colors, continue with step 10a. If there is banding in only a few colors go directly to step 11.



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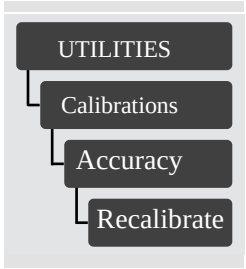
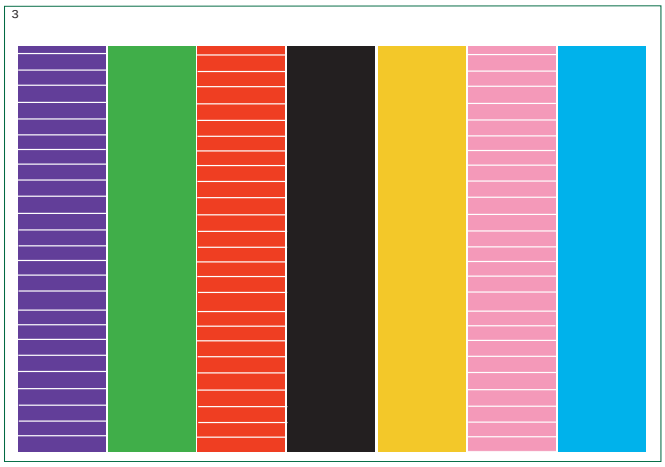


a It is possible that the banding was caused because the customer was using non-HP media. If the customer still wants to use non-HP media, recalibrate the paper accuracy by performing the accuracy calibration. Performing this will overwrite the default setting for **only** the paper that you have selected.

If the customer wants to use HP certified paper at a later stage, they can restore the optimal setting to what it was by going to Utilities/Calibration/Accuracy/Restore Factory.

11 When you look at the image you have printed there is banding on the image, but only in a **few** colors, similar to the example shown below.



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a The possible combinations with this problem are:

- Banding in **cyan**, **blue** and **green** columns only, but more evident in cyan. This means that the cyan printhead could be permanently damaged.
- Banding in **magenta**, **red** and **blue** columns only, but more evident in magenta. This means that the magenta printhead could be permanently damaged.
- Banding in **yellow**, **red** and **green** columns only, but more evident in yellow. This means that the yellow printhead could be permanently damaged.
- Banding in **black** column only. This means that the black printhead could be permanently damaged.

b If you want optimal print quality from your printer, replace the damaged printhead with a new one.

However, the printer can still produce good quality line prints.

No Printing Defects Found in the Print Quality Test

If all the test patterns from the Print Quality Test are correct and you still experience print quality problems, here are some of the more likely causes to check:

- The print mode used in your printer is not right for the image you are printing (this is defined by the printer's front-panel menu selections)
- Non-HP driver
- The RIP (If you are using one)
- The software applications you are using.

Use the following table to configure your system correctly.

What to Configure	Configuration Setting	Optimal Setting
Printer Front-Panel Menu	Media	Unload the current media and load it again after changing the media type in the front panel.
	Dry time	Set to Automatic.
HP driver (Windows, AutoCAD or Mac) (hp designjet 1000)	Print mode setting	Set to Best.
Non-HP drivers (Software RIPs)	The settings available depend on the driver. The most typical settings are: ■ Print Quality Settings ■ Half Tone ■ Media selection See the user's guide for your application for more information about its print quality settings.	In the software application: ■ Set Print Quality to Best ■ Use no Half Tone (or printer default.) ■ Make sure that the media setting matches the media loaded in the printer.

Solving Color Accuracy problems

These are two areas you should review when troubleshooting a color accuracy problem:

Configuration (PostScript option only)

Check that you are using the correct driver setting and CRD information for the software. Check which ink emulation mode has been selected in the front panel.

Media

Make sure that the media loaded is genuine HP media and that the correct media type has been selected on the front panel and in the driver.

Color Consistency problems

- If color consistency is important for the customer, it is recommended that they do not use HP-GL/2 to print with.
- Some media may discolor or change with age. Check that the media is fresh and has been stored correctly.
- If the environmental conditions that the customer is printing in change rapidly, you may see changes in the color consistency. By reducing the time the print stays in extreme environmental conditions after being printed (especially very high humidity) you can reduce the color consistency problems.
- If you notice that there are color changes between different printers i.e. between the 750C and this printer. It is normal. There will be color differences between HP DesignJet printers because the other printers use a different type of ink.

Long Term Color Bleeding (Glossy Papers)

If you see the colors are bleeding into the paper i.e. the color is soaking into the paper making the lines fuzzy and bleary. This will be because of the humidity conditions that the printer is working under:

- Ask the customer to change the paper that they are printing with.

or

- Remove the printer from the high humidity conditions.

Color Accuracy Configuration

The configurations of the printer, the driver, and the software RIPs define how ink is applied to each type of media. Use the information in the following table to configure the printer and software for best color accuracy.

Location of Setting	Setting Description	Selection
Printer Front-Panel Menu	Media	■ Set to match the media type loaded in the printer.
	Ink Emulation (PS only)	■ Set the type of CMYK inks that your software generates. If you use HP drivers use "Native".
	Ink Limiting (PS only)	■ Set to ON.
	Color Calibration (PS only)	■ Set to ON.
HP Drivers	Media	■ Set to match the media type loaded in the printer.
Non-HP drivers (Software RIPS)	Media or equivalent setting	■ Set to match the media type loaded in the printer. See the documentation that came with your software for information.
	Color correction option or equivalent	■ Do the color correction calibration if one is available.

Media

Always make sure that the customer is using the appropriate media for the required image and that it is consistent with the software application being used. To ensure color accuracy and print-quality performance of the printer, only media types that have been certified for the printer should be used. Use of non-HP media or HP media not certified for the printer may significantly reduce the color and print quality of the required images. For details of HP media, refer to the **User's Guide** or the **Media Guide for the HP Designjet Printers**.

To have accurate colors, the media settings must match the type of media loaded in the printer.

If the customer is using non-HP media with HP drivers, the colors in the required print may not be accurate. Advise the customer to use HP media if they want to improve the accuracy of the colors.

There are Smears or Scratching on the Printed Media

This problem can appear on paper-based coated media if a lot of ink printed quickly. The media cannot absorb the ink quickly enough and becomes distorted. As the printheads move over the media, the printheads and the media come into contact with each other and the printed image is smeared.

1. Press the **Cancel** key on the front panel; if you continue to print, the paper may damage the printheads.
2. Cancel the print job from your computer application.
   In order to obtain better results perform the following:
   - Use HP recommended media. If the image you are printing has intense color, use HP Heavy Coated Paper
   - Use extended margins, or try to increase the print margins by relocating the image on the page from the software application.
   - If the customer is using 'Media Saving Options' from the advanced section of the HP- GL/2 Driver, try disabling one or both of the options 'auto rotate' and 'inked area'.

   If the above fails to solve the problem of smears and scratching, change the media that the customer is using to a non-paper based media such as HP High Gloss Photo Paper.