



Identifying and Removing Unintentional White Lines During Cut Sheet Printing

For the HP PageWide XL Pro Printer Series

The objective of this document is to help with the following topics:

- Identify white line defects.
- Prevent white line defects.
- Clean the printheads to remove white line defects.

Summary

White line defects are long bands of unprinted substrate within an area fill. Since the substrate is usually white, the bands are usually white. They are often less than 1 mm wide (very thin) and extend in the direction of printing (from leading to trailing edge) for 10 cm or more. If the line is not in the direction of printing, it is unlikely to be the type of defect discussed in the following procedure.

There are two sources of white lines. Misalignment between printhead dyes is one source and can be identified by their evenly spaced, predictable locations at the intersection between dyes. The solution to this type of white lines defect is not covered in this procedure. The other source of white lines which is covered in this procedure is a clogged printhead nozzle. Unable to discharge ink, clogged nozzles leave a string of unprinted surface where there should be ink, and can be very unsightly, especially in large quantities.

Dust can very easily clog printheads, but the net positive pressure in the print zone ensures that most dust particles are not able to enter the printer through the air, and the probability of white lines is typically very low. However, they can enter attached to the leading edge of cut sheets with poor cut quality. The result is a series of clogged printheads which produce the white line defect.

To prevent clogged printheads, clean the edges of the cut sheet piles and clean the surfaces the cut sheet edges can touch (Sheet Feeder bridge and tray, printer paper input tray). This prevents particles from traveling into the printer on the cut sheet edges. Once inside the printer, printing in Normal mode removes paper fibers from the print zone via the Airflows. In Fast Mode, the Airflows are inactive.

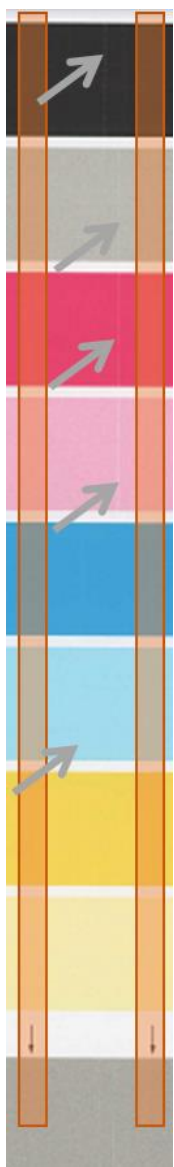
To fix clogged printheads, use the Printhead Recovery tool in the Optimize Print Quality menu of the front panel. Sometimes, one Printhead Recovery is not sufficient to clean the printheads. Print a diagnostic plot to check and repeat the process if needed.

Tools Needed

- 4 or more cut sheets of any type
- HP PageWide XL Pro printer

Procedure

White line defects are long bands of unprinted substrate within a filled area. Since the substrate is usually white, the bands are usually white. They are often less than 1 mm wide (very thin) and extend in the direction of printing (from leading to trailing edge) for 10 cm or more. If the line is not in the direction of printing, it is unlikely to be the same type of defect.



The attached image is an example of the white lines defect. Note there are two sources of white lines.

The gray arrows indicate the white lines caused by nozzle clogging.

The orange boxes indicate the zones between dyes. On the diagnostic plot, the orange boxes do not appear, but there is an arrow at the bottom of the plot indicating that the location is a zone between the dyes (at the bottom of the orange boxes in the image). There are often white lines in this region, but they are not due to nozzle clogging, so we cannot fix those lines using the procedures of this document. Those white lines are caused by nozzle interaction between dyes and can be improved with printhead alignments, which is discussed in a separate procedure.

Why might this happen?

Clogged printhead nozzles cause white lines. Unable to discharge ink, clogged nozzles leave a string of unprinted surface where there should be ink, and can be very unsightly, especially in large quantities.

Dust can very easily clog printheads, but the net positive pressure in the print zone ensures most dust particles are not able to enter the printer through the air, and the probability of white lines is typically very low. However, they can enter attached to the leading edge of cut sheets with poor cut quality. The result is a series of clogged printheads which can produce the white line defect.

Cut sheets sometimes have loose fibers because of the way the sheets are cut in manufacturing. It also depends on the supplier, the composition, and the thickness of the paper. This rarely affects paper rolls.

Sheets are stored horizontally. If they are left uncovered, dust in the air falls on them. Paper fibers or dust may pass from sheets to the printhead nozzles as they enter the printer. When multiple nozzles are clogged in this way, you may see long, white, vertical bands or lines on your prints.

To avoid this problem:

Try to remove fibers and dust from the sheets of paper.

1. Keep your sheets of paper covered, unless you plan to use them soon; or clean or discard the top sheet of the stack just before printing.
2. Remove large particles with a cloth that attracts fibers and dust (if necessary, use sandpaper to smooth the edges of the stack).
3. Clean the edges of the stack with a vacuum cleaner or with compressed air.

Activate the Airflows while printing by using the Normal print mode.

4. Print using the Normal print mode rather than the Fast print mode. The Normal print mode activates the Airflows vacuum and removes fibers from the print zone.

If using the sheet-feeder, try to keep the sheet-feeder surfaces clean to avoid dust contaminating the paper.

5. Once a week, use a cloth to clean the sheet-feeder surfaces and printer input area (the area through which the sheets slide during the feeding operation).
 - a. Put the sheet-feeder bridge down and open the paper input tray.
 - b. Clean the dust from the visible surfaces of the paper input tray, especially the channel through which the media enters.



- c. Clean the bridge, especially the area near the guide. Clean the green belts by spinning them with one hand while applying pressure with the cloth on the belt with the other hand. Wipe down the guide and clean the metal guide rollers.



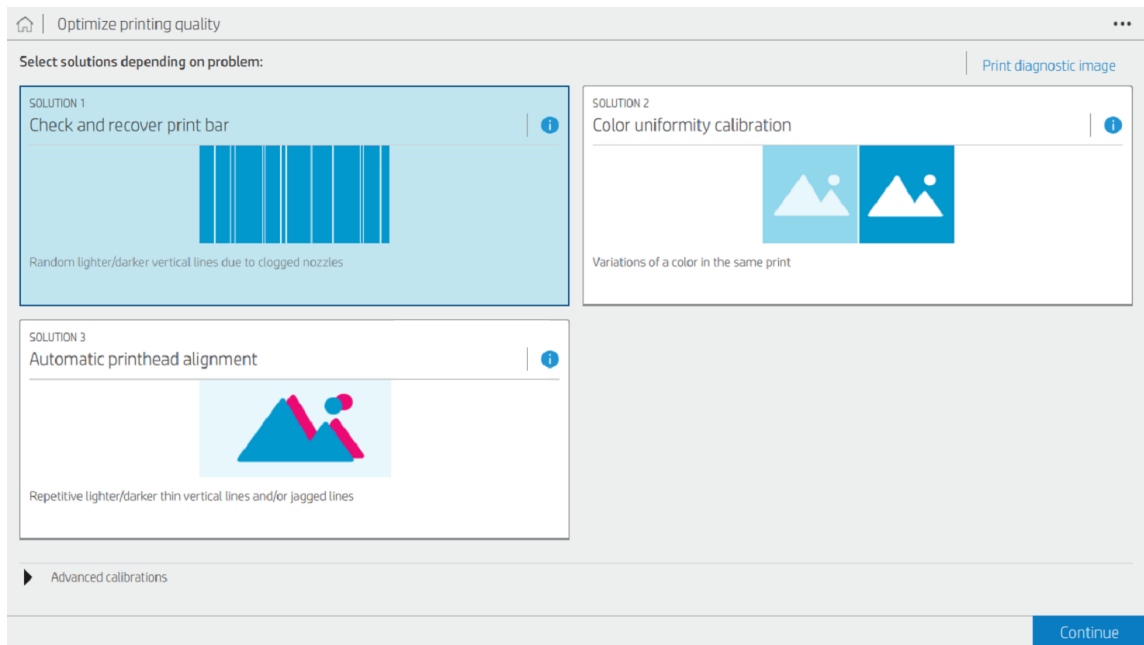
- d. Clean the tray and the space under the sheet-feeder roof.



To respond to the problem:

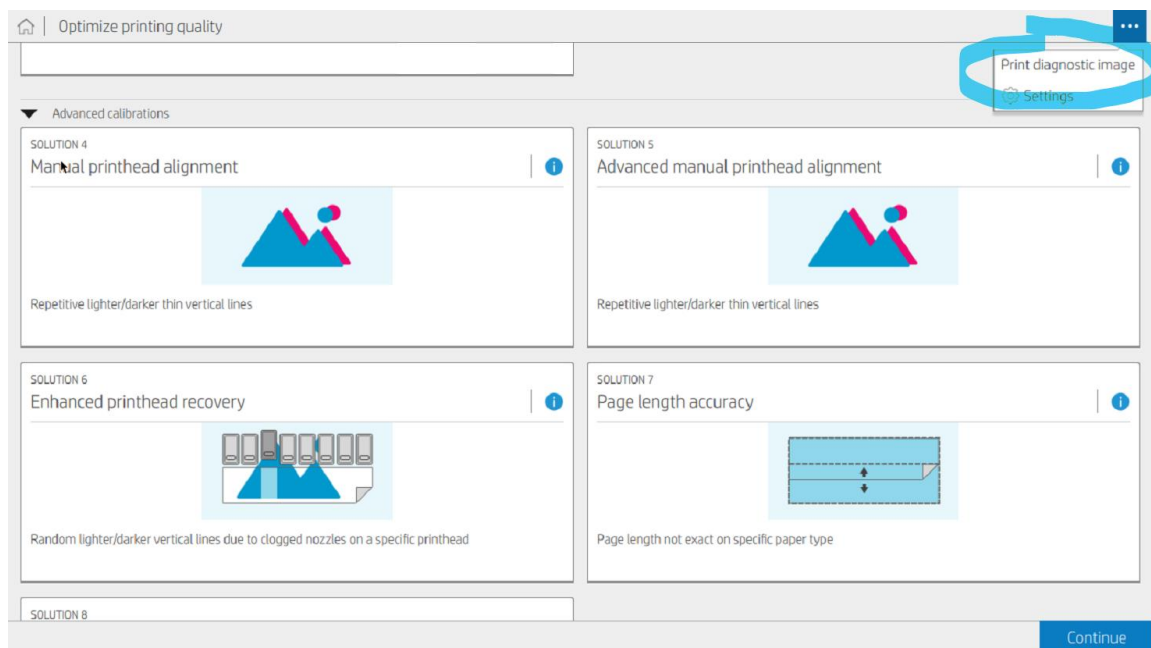
Recover or replace the affected printhead(s).

1. Go to the printer's front panel and perform Check & Recover printheads.

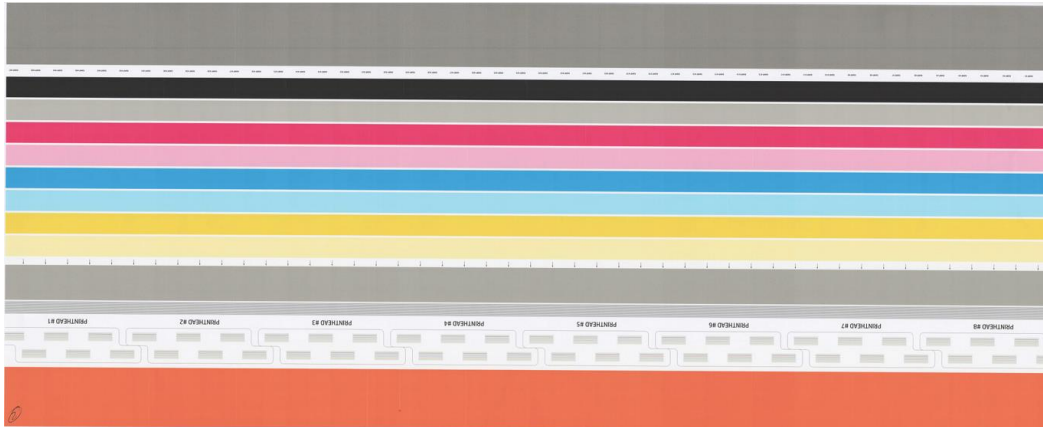


2. Print a diagnostic plot and check for white lines in the small strips of cyan, yellow, magenta, gray, and black ink. The lines in the gray regions may not be completely white.

Where to print a diagnostic plot



An example of a diagnostic plot



3. If the problem persists, perform an Enhanced printhead recovery. Select all the printheads, or just the ones which contain white lines and then press “Recover.” The Enhanced printhead recovery process will use more ink, so it may be advantageous to carefully select which printheads need Enhanced printhead recovery.

The screenshot shows the printer's control panel interface. At the top, it says 'Optimize printing quality'. Below that, there's a section for 'Advanced calibrations' with several options:

- SOLUTION 4: Manual printhead alignment (Repetitive lighter/darker thin vertical lines)
- SOLUTION 5: Advanced manual printhead alignment (Repetitive lighter/darker thin vertical lines)
- SOLUTION 6: Enhanced printhead recovery (Random lighter/darker vertical lines due to clogged nozzles on a specific printhead) - This option is highlighted in blue.
- SOLUTION 7: Page length accuracy (Page length not exact on specific paper type)

At the bottom of the calibration screen is a 'Continue' button. Below this is the 'Enhanced printhead recovery' screen, which asks the user to 'Select one or more printheads to clean:'. It shows eight printhead slots, numbered 1 through 8, each with a 'YCMK' label. A blue selection bar highlights printheads 3, 4, 5, and 6. Below the slots, there are dimensions: 11" for the width of the highlighted area, 24" for the width of the entire row, and 36/40" for the overall width of the printer bed. At the bottom left, there is a clock icon and 'ESTIMATED DURATION 5 min'. At the bottom right, there are 'Cancel' and 'Recover' buttons.

4. Repeat the diagnostic plot (step 2).
5. Repeat steps 3 to 4 if the white lines persist until the white lines disappear or after the problem stops improving, typically after 3 or 4 cycles. It is also possible to alternate the “Check and recover print bar” action (step 1) with the “Enhanced printhead recovery” action (step 3), if desired.
6. If the problem persists, replace the affected printheads.
7. If the problem persists with the new printheads, contact a service representative.

Results

A printer which does not cause white lines defects until the next contamination.

NOTE: White lines will return periodically, depending on the likelihood that fibers enter the print zone. It is possible to mitigate the reoccurrence by consistently cleaning the Sheet Feeder accessory surfaces and removing loose fibers from the edges of poorly cut sheets. Removing loose fibers is the most effective mitigation tactic.
