

5-2 Problems with Poor Nozzle Health

5-2-1 Dead or Dying Pen Needs Replacement

Symptoms and Possible Cause:

Streaks appear in the printed content. It may affect entire pens, entire colors, or throughout all printed content. Streaks are very wide and could be called bands. Nozzle health is poor. Old pens need replacement. “Old” is based on nozzle health and not age.

Actions:

- Run a Printhead Service Routine and run a startup calibration to check nozzle health.
- Replace any pens that have used up their life expectancy – they may have failed resistors and worn silicon and must be replaced.
- Always handle and install printheads gently to prevent impacts and shaking.



WARNING: Always return printheads to the capped position when not printing, except for cleaning or maintenance. Printheads should not remain uncapped for more than 30 minutes when not printing, even during cleaning and maintenance.

5-2-2 Printhead Starvation (Ink Delivery Problem)

Symptoms and Possible Cause:

Streaks appear in the printed content. It may affect entire pens, entire colors, or throughout all printed content. Streaks are very wide and could be called bands. Nozzle health is poor. One or more printheads have been starved of ink and are unable to print. In severe cases, an entire printhead may have deprimed. The ink flow may be restricted somewhere in the ink path. The ink pumps may not be pumping properly.

Images:

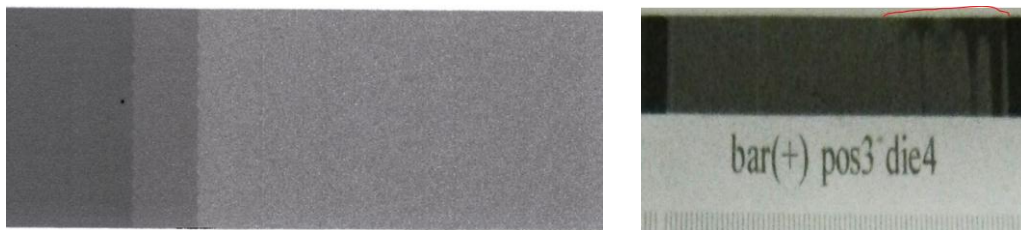


Figure 5-2-2-1 and 5-2-2-2: Evidence of printhead starvation

Actions:

- Identify how many and which printheads are not printing. Locate the kink, blockage, or other failure and repair or address. If only one printhead is missing, then the issue is near that printhead. If all printheads of one color on an arch are missing, then the failure is in the supply for the entire color.

- Weigh pen and replace if under 260 grams.
- Check that the Ink Delivery System is working properly. All pumps should be working. There should be no kinks, blockages, or air bubbles in ink lines. Ensure that degasification units are working properly.
- **If a T2XX Press:** install a solenoid valve and fluid interconnect blocks kit on the lines from the IDS to the press if not already done. [Contact HP Services](#) for more information. This kit will help avoid air bubbles building up in the lines and starving the printheads.
- Note: in Figure 5-2-2-1 a sine wave pattern can be seen on the border between the printing and not-printing printheads. This pattern is normal; it is used to help mask die and printhead boundaries.
- Starved printheads may have de-primed/ingested air. If only a small amount of air was ingested, it may dissipate over time. Put printheads into the capped position for about 15 minutes and then check nozzle health again with a startup calibration. (For more, see 5-2-3 [“Air Ingested into Printheads”](#).)

5-2-3 Air Ingested into Printheads

Symptoms and Possible Cause:

Streaks appear in the printed content. It may affect random single nozzles, localized areas, entire trenches/dice, entire pens, entire colors, or throughout all printed content. Streaks that are very wide could be called bands. Air may have been ingested into printheads on a small or large scale. Ingested air can be caused by the user installation process, improper printhead storage orientation, slight printhead impacts, printheads left in the uncapped position, or printhead starvation. In the case of printhead starvation, see 5-2-2 [“Printhead Starvation”](#).

Images:



Figure 5-2-3: Streaking, possibly due to air in nozzles

Actions:

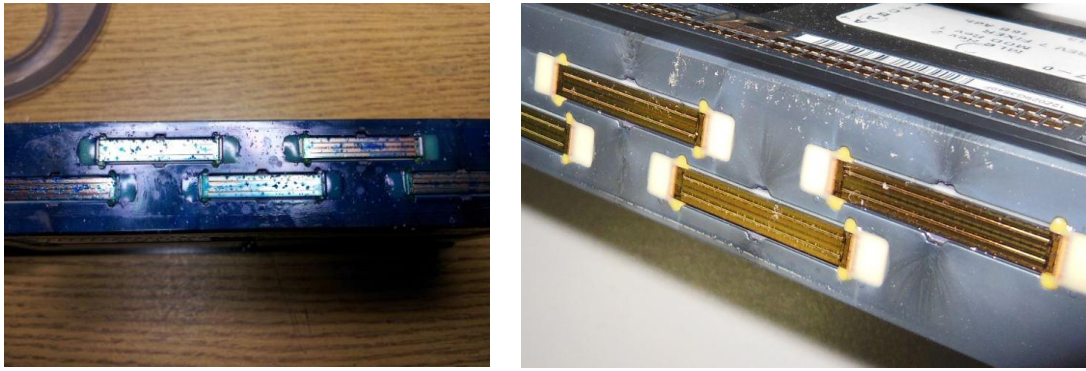
- If only a small amount of air was ingested, it may dissipate over time. Put all printheads into the capped position for about 15 minutes and then check nozzle health again with a startup calibration.
- If too much air has been ingested into the printhead, it cannot recover nozzle health. If a printhead weighs less than 260 grams, it must be replaced.
- Check that the Ink Delivery System is working properly. All pumps should be working. There should be no kinks, blockages, or air bubbles in ink lines. Ensure that degasification units are working properly.
- If nozzle health has not improved, run 2 or 3 Startup Calibrations with Ink Density selection set to "High". This may force ingested air out of the printhead. Check nozzle health is acceptable and print job. Be sure to check bonding agent health on IPC plot as well.
- If the high density startup calibrations do not help reduce the burn-in or ghosting effect, run the "Colortest_KCMY_40in_4pg.pdf" file. This attempts to exercise all nozzles more fully. The file is available on e-Tools in the Repair & Maintenance folder under "General" and is titled "Print Quality Colortest Colortest KCMY_40in_4pg".
- If unable to take time to wait for dissipation, the recently installed printhead can be removed and repackaged for storage and reused at a future time. Be sure to replace the orange cap and needle plug, repackage in original packaging and store again in the proper orientation (nozzles UP).
- Ingested air can also cause printheads to overheat, which may damage resistors.
- **If a T2XX Press:** install a solenoid valve and fluid interconnect blocks kit on the lines from the IDS to the press if not already done. [Contact HP Services](#) for more information. This kit will help avoid air bubbles building up in the lines and starving the printheads.

5-2-4 Contamination of Printheads

Symptoms and Possible Cause:

Streaks or bands appear in the printed content. Streaks are thin and are caused by small clusters of missing nozzles. Bands are caused by large areas of missing nozzles. Contamination has blocked nozzles from firing correctly. This contamination could be dirt or fibers stuck on the printhead. In the cases of dust/fibers and bonding agent contamination, nozzle health may slowly degrade during printing. Bonding agent aerosol can be contaminating the KCMY printheads, usually black. Pigment may have settled during long term storage and clogged nozzles. Kogation or aerosol buildup may be blocking nozzles. A51 printheads with an expiration date before November 2014 have a known problem with clogged nozzles after long term storage.

Images:



Figures 5-2-4-1 and 5-2-4-2: Severe BA contamination (left) and fiber contamination (right)

Actions:

- Run Printhead Service Routine
- In the case of dirt or fibers stuck to the printhead, there may be an accompanying drip on the media. Follow the actions of 3-1-1 [“Fiber or Contamination on the Printhead”](#). These actions are generally useful for any contamination of printheads.
- Check printheads for evidence bonding agent contamination. Check that all aerosol ducts are working properly, not blocked or dirty, especially bonding agent aerosol ducts. Check all bonding agent components for leaks or damage. Clean or repair as required.
- Check static bars for ink accumulation, contamination, or damage. Clean or repair as required.



WARNING: Do not cross contaminate bonding agent with ink while cleaning. Use separate wipes and gloves for bonding agent and inks.

- Run 2 or 3 Startup Calibrations with Ink Density selection set to "High". This may exercise all nozzles more fully. Check nozzle health is acceptable and print job. Be sure to check bonding agent health on IPC plot as well.
- If the high density startup calibrations do not help reduce the burn-in or ghosting effect, run the "Colortest_KCMY_40in_4pg.pdf" file. This attempts to exercise all nozzles more fully. [Contact HP Services](#) for this file (if the embedded file below is not working).
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- The printhead may simply be past its product life expectancy – it has failed resistors and worn silicon and must be replaced.