TROUBLESHOOTING NOZZLE ISSUES

Nozzle tests should be printed frequently to verify that the print head is performing optimally. The best way to prevent having to change a print head is to keep track of nozzle health.

Choosing Material for Printing Nozzle Tests

One of the most common mistakes when printing a nozzle test is choosing a material that does not properly show the printed output. The material needs to clearly show all 8 (small-format printers) or 10 (large-format printers) channels. White materials will not show the Clear and White nozzles while Black materials will not show the CMYK nozzles. Use a material with a matte finish and neutral color so all nozzles can be clearly seen.

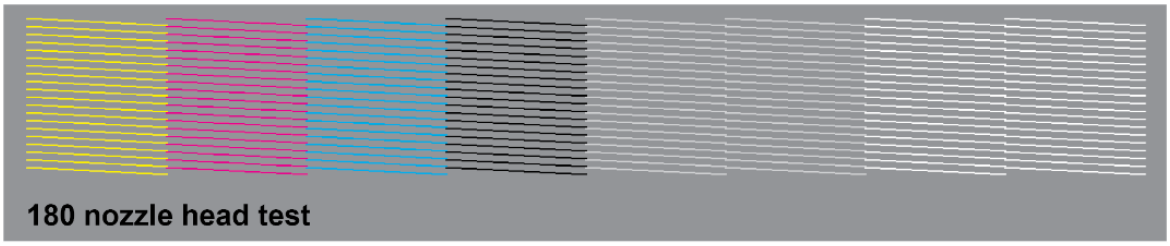
What a Correct Nozzle Test Looks Like

Before explaining abnormalities with nozzle tests, it is important to know what a correct nozzle test should look like after printed. Be sure to always pay attention to the following…

A. All Channels are printing

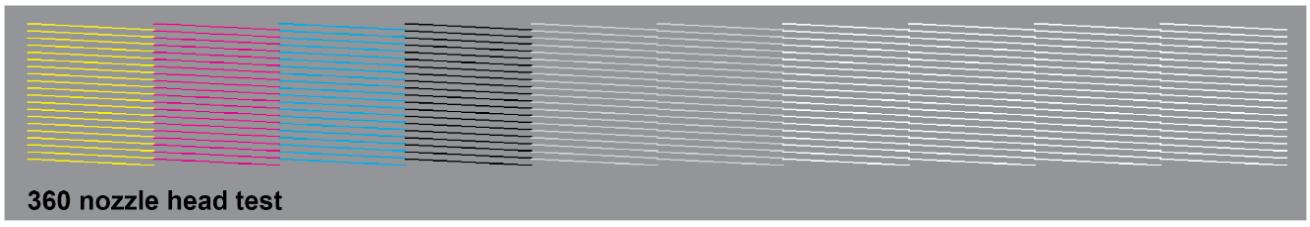
Small-Format Printers (Print Width 10” or 12”)

One channel is made up of 180 nozzles. There are eight channels total that print when the Small-Format Nozzle Test is run. The channels print directly beside each other so there should be no gaps in between sets of nozzles. Depending on the material used, the nozzles might be difficult to see so it is important that you use a material that clearly shows all nozzles and channels.



Large-Format Printers (Print Width 24”)

One channel is made up of 360 nozzles. There are ten channels total that print when the Large-Format Nozzle Test is run. Depending on the material used, the nozzles might be difficult to see so it is important that you use a material that clearly shows all nozzles and channels.



B. The Channels are in the Correct Order

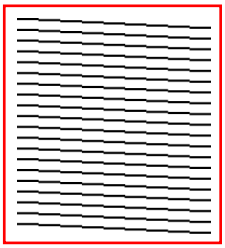
Small-Format Printers (Print Width 10” or 12”)

The Nozzle Test prints in the same order as the channels are arranged on the print head. For the small-format printers, this order is; Yellow, Magenta, Cyan, Black, Clear1, Clear2, White1, White2 (refer to the 180 Nozzle Head Test image above).

Large-Format Printers (Print Width 24”)

The Nozzle Test prints in a slightly different order than the channels are arranged on the print head. For the large-format printers, this order is; Yellow, Magenta, Cyan, Black, Clear1, Clear2, White1, White2, White3, White4 (refer to the 360 Nozzle Head Test image above).

C. Individual Nozzles form straight lines and are staggered

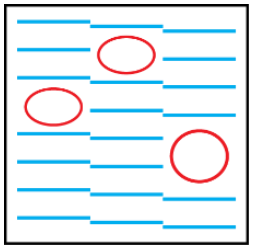


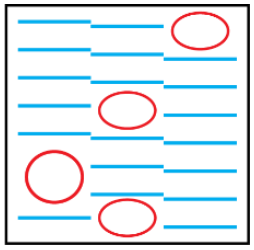
When the nozzles are jetting correctly, each channel should look like the image shown here. Each column is staggered by one pixel which creates a stair-step pattern and each individual nozzle forms a straight line which is offset to the nozzle adjacent to it.

Different Kinds of Irregular Nozzle Tests

The information below classifies different irregular nozzle tests.

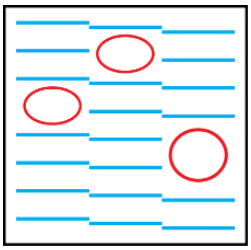
A. Unstable Nozzle Out

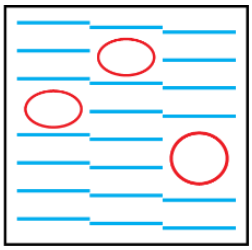




The missing nozzles change positions after cleanings. This typically occurs when there is air trapped in the ink system, either in the ink lines, dampers or print head itself. Air can enter the ink system in a few different ways. This is often caused by a poor seal being made by the capping station that allows air to enter the ink system during a head clean. This can also occur if any of the ink tanks were run empty and therefore pulled air into the system through the tank.

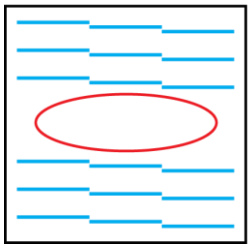
B. Stable Nozzle Out

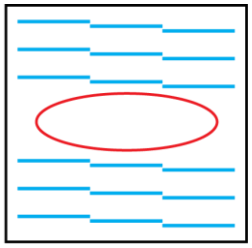




The missing nozzles do not change position after cleanings. This can occur if there is something on the print head nozzle plate that is obstructing the nozzles from firing i.e. dust, debris or cured ink. This can also occur if the print head nozzle plate was damaged due to a print head crash or if the print head rubbed on the surface of the substrate.

C. Multiple Missing Nozzles



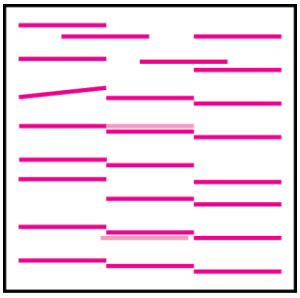


The missing nozzles are all adjacent to each other. This can occur if there was a print head rub on the surface of the substrate in one particular spot. There can be debris or damaged nozzles in the area that the print head made contact with the substrate. This can also occur if the rubber caps on the capping station are deformed and not creating a good seal to this part of the print head.

D. Entire Channel(s) Missing

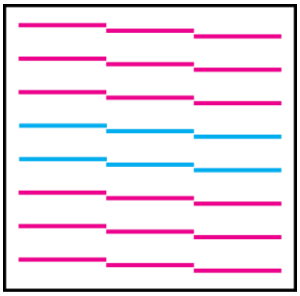
The missing nozzles are all part of one channel or multiple channels. This can occur for many different reasons. This can occur if there is no ink in the ink tank or an obstruction to the ink in the ink lines, damper or print head. There is also the possibility of an electrical issue which causes that particular channel not to fire, however this is not as common.

E. Nozzle Deflection



The nozzles are deflected from their correct position. All nozzles might still be firing but they are not in the positions or at the angle that a normal, good nozzle test displays them. Some of the reasons for this are, the head height may not be set correctly, the print head nozzle plate has been exposed to a great deal of stray UV Light, typically from printing onto reflective or semi-reflective materials or not following best practices for masking voids over the print area. This can also occur if there has been an excessive amount of overspray/ink mist generated from printing with the print head height too high (greater than 2mm). Sometimes, this can occur if the correct operating and storage temperature has not been maintained in the work area. All DCS printers should be operated and stored in a temperature between 60°F – 80°F and a humidity of 20% - 80%.

F. Mixed Colors



The nozzles for the correct color are mixed with the nozzles from a different color. For example, the Magenta Channel has lines of Cyan.

Direct Color Systems®

Nozzle Recovery Procedure

A. Make sure that the printer environment (Temperature, Humidity, and Cleanliness) is under the specifications.

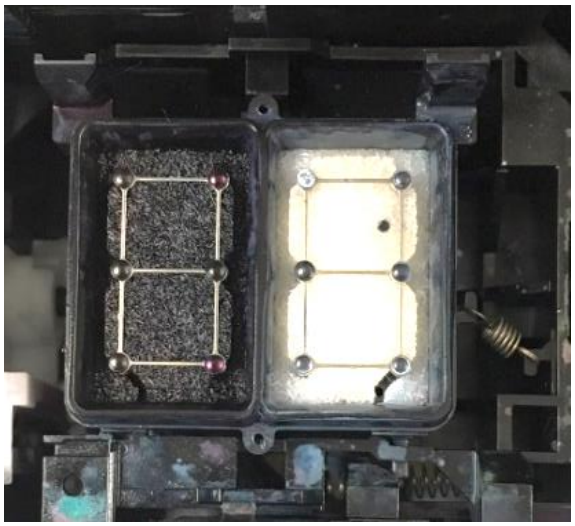
- Allowable Operating & Storage Temperature: 60°F - 80°F (16°C - 26°C)
- Allowable Operating & Storage Humidity: 20% - 80% non-condensing
- Cleanliness: Equivalent to the normal office level: the floating dust amount has to be 0.15mg/m^3 or less
- Ensure the inks are within the recommended shelf life of 6 months once opened and 1 year unopened.

B. Make sure that the Bulk Ink Tanks are full with Ink (Bulk Ink System Printers Only)

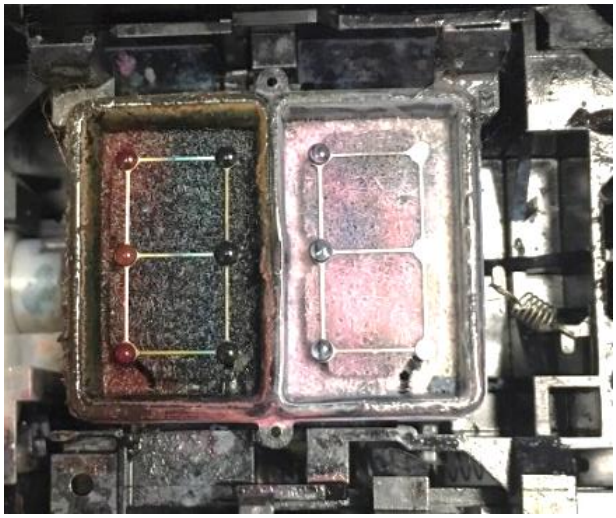
- Ensure that the black shipping plugs are removed from the tanks and the stainless steel breathers are installed in their place.
- Fill any Bulk Ink Tanks that show LOW or do not have an LED (Full or Low) lit. Keeping all Ink Tanks full will help with ink flow through the ink system.
- If issues are within the white channels, ensure that the white ink circulation pump is functioning properly.
- Check that all Ink Tank Sensors are working properly. If the Ink Tank Sensors get stuck in a position or fail, they will not display the actual level of ink in the tank. For instance, the sensor might always read full even if the ink tank is empty. * Please contact tech support for further assistance with diagnosing and troubleshooting ink tank issues.

C. Inspect & Clean the Capping Station Components – Replace if Necessary

- **Caps:** Inspect the Caps for any distortion and/or damage. Use a swab and IPA to remove any ink on the caps.
- **Wiper:** Inspect the Wiper Blade for any distortion and/or damage. Use a swab and IPA to remove any ink on the wiper blade.
- **Spit Pad:** Remove any excess ink build up in the spit pad/spit tray.
- **Ink Waste Bottle:** Check that the Ink Waste Bottle has been emptied.



Capping station after a few weeks.



Capping station after a few months. Most likely needs replacing.

D. Perform Automatic Head Clean Functions

- Perform 2x Initial Charge (Small-Format Printers) or Power Clean (Large-Format Printers)

E. Manually Clean the Print Head – Perform Step D again after cleaning the Print Head

IMPORTANT: Use extreme caution when manually cleaning the print head.

- Gently wipe the Print Head Nozzle Plate with an IPA Wipe. Feel for any cured ink that might be on the surface and inspect the nozzle plate for any physical damage such as dents or scratches as these can cause nozzle issues.

If you have performed Steps A-E and the nozzle issues are not resolved, contact Technical Support.