

HD Print Quality Defect Root Causes:

1. Voids in Print

- a. Missing Nozzle or Nozzles
- b. Head Boundary Issue (B pin adjustment)
- c. Corrupted Uniformity (Jet Inspection Created with too many Jetouts)
- d. Heads were uncapped causing missing nozzles on many printheads

2. Vertical Color Registration

- a. Paper Thickness or Tension Setting Incorrect in the Print Condition Menu
- b. Print Condition that is loaded does not match Print Condition in Job
- c. Wavy Paper
- d. Corrupted Automatic Alignment (JI Scan)
- e. Corrupted Manual Alignment Adjustments for Vertical (Input from operator)

3. Horizontal Color Registration

- a. Paper Tracking Incorrectly Through the Press
- b. Wavy Paper
- c. DNS Sensor Dirty
- d. Corrupted Manual Alignment Adjustments for Horizontal (Input from operator)

4. Streaks from Drags on the Page

- a. Dried Ink or Material Hanging from Printhead Array
- b. Buildup on Flushing Sponges (Under the Printheads)
- c. Paper sucked into NIR (blocked filter)

5. Nozzles Dropping Out While Printing

- a. Static on Paper – Too Little humidity
- b. Moisture in Paper – Too Much Humidity
- c. Ink Drips on Printheads which Dry while Printing
- d. Inadequate Flushing Selected for Job Being Printed

6. Density Shifting While Printing – Uneven Uniformity

- a. Uniformity Corrupted
- b. Printhead A-pin Adjustment Is Out Of Tolerance
- c. Paper Tracking Incorrectly

7. Ink Picking or Smearing

- a. Density (AIA) Set Too High
- b. Speed Too Fast for Paper Type/ Ink Amount
- c. Temperature Is Not Set High Enough

8. Constant Firing Nozzle(s) or Drooping Nozzles (Delamination)

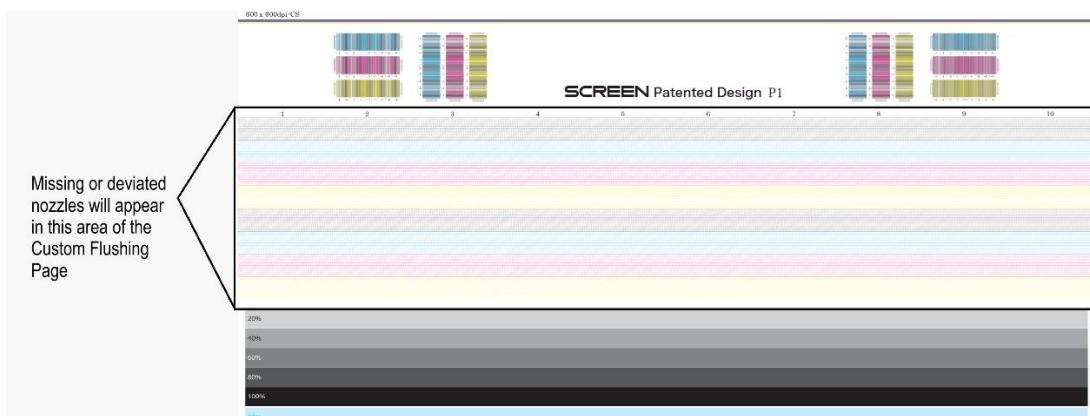
- a. Printhead is Defective

Print Quality Defect Root Causes Checklist:

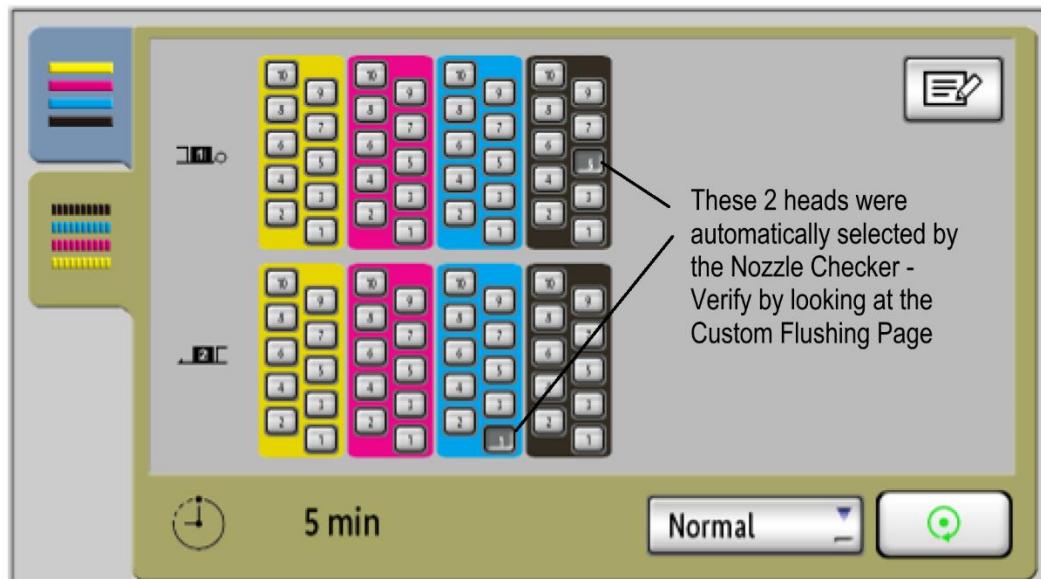
1. Voids in Print

a. Missing Nozzle or Nozzles

- i. Check the Custom Flushing Page that prints at the end of the job and compare the jet outs detected by the Nozzle Checker to the job being printed.



- ii. The Nozzle Checker will display the following message at the end of a job, then when the Head Cleaning Menu is opened – the heads with detected nozzle outs will be automatically selected.



iii. Perform a Normal Cleaning on the Affected Printheads. If Jet Outs do not improve after checking results - visually verify proper cleaning of the Printheads as described below:

Head cleaning sequence check procedure

- (1) Pull out the head unit.
- (2) Execute head cleaning selecting [Intense].
- (3) Watch the surface of print head. If ink appears on the surface of selected head, the head cleaning sequence work properly. If ink does not appear, see following trouble shooting.

! If head cleaning mode [Intense] is selected, the machine suck and wipe front side head of the head module at first, and next, the machine suck and wipe rear side head of the head module.

About each head cleaning mode

e.g.

When executing cleaning head by [Intense] mode, and select Head module No.2.

- 1) The machine sucks and wipes H2.
- 2) The machine sucks and wipes H12.

When executing cleaning head by [Normal] mode, and select Head module No.2.

- 1) The machine sucks and wipes H2 and H12 simultaneously.

When executing cleaning head by [Extreme] mode, and select Head module No.2.

- 1) The machine purges ink from H2 and sucks simultaneously, and wipes H2.
- 2) The machine purges ink from H12 and sucks simultaneously, and wipes H12.

Explanation	Trouble shooting
Ink appears on the surface of selected head.	Head cleaning sequence work properly
Ink does not appear on the surface of selected head or there are few amounts of the ink which appeared.	A possible defect Sucking power is not enough. Capping position has shifted. Defect of cap. Defect of sucking pump. Defect of solenoid for sucking pump. Mixing of the air to ink tube.
Ink leaks from the surface of un-selected head.	Defect of Rotary valve.

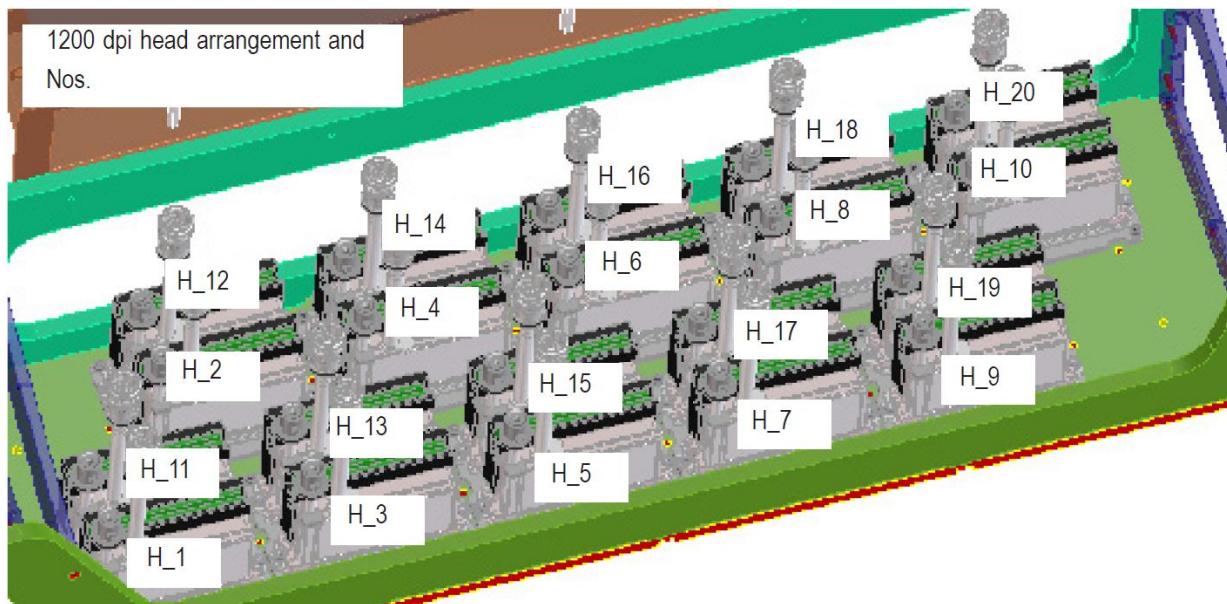


Head surface condition when [Intense] is selected and work properly.

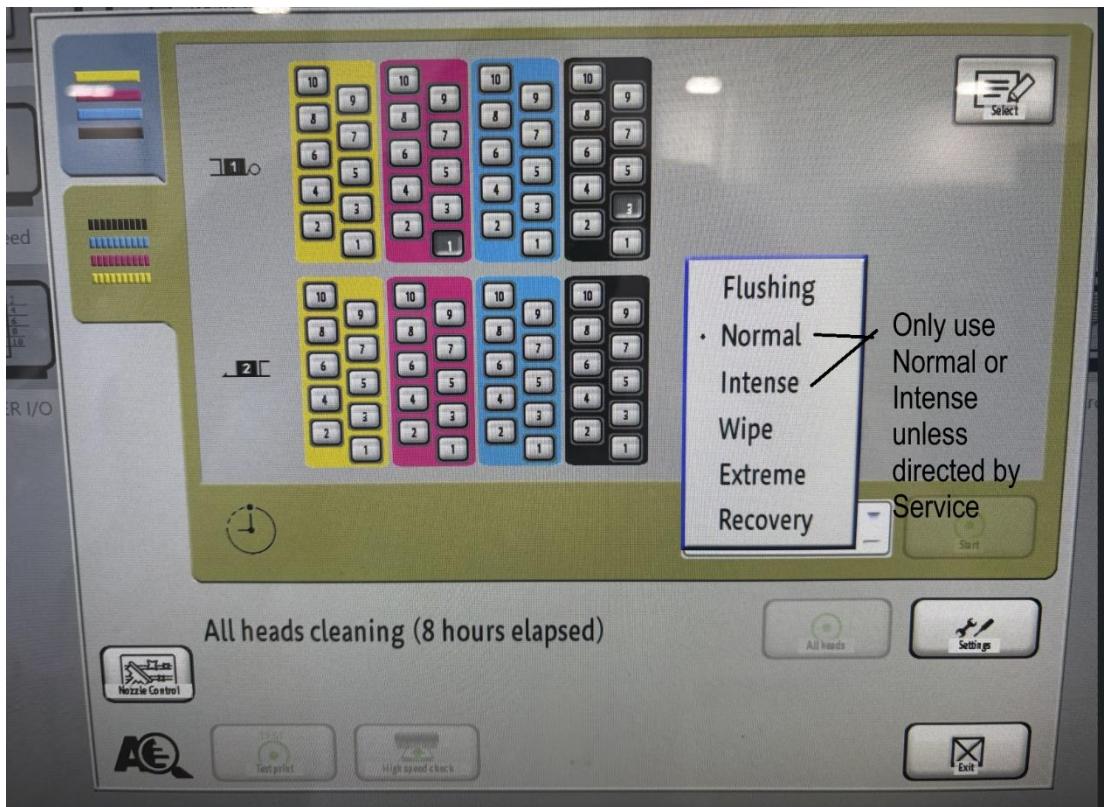


Head surface condition when [Normal] is selected and work properly.

Printhead Array as seen from the top with Head numbers

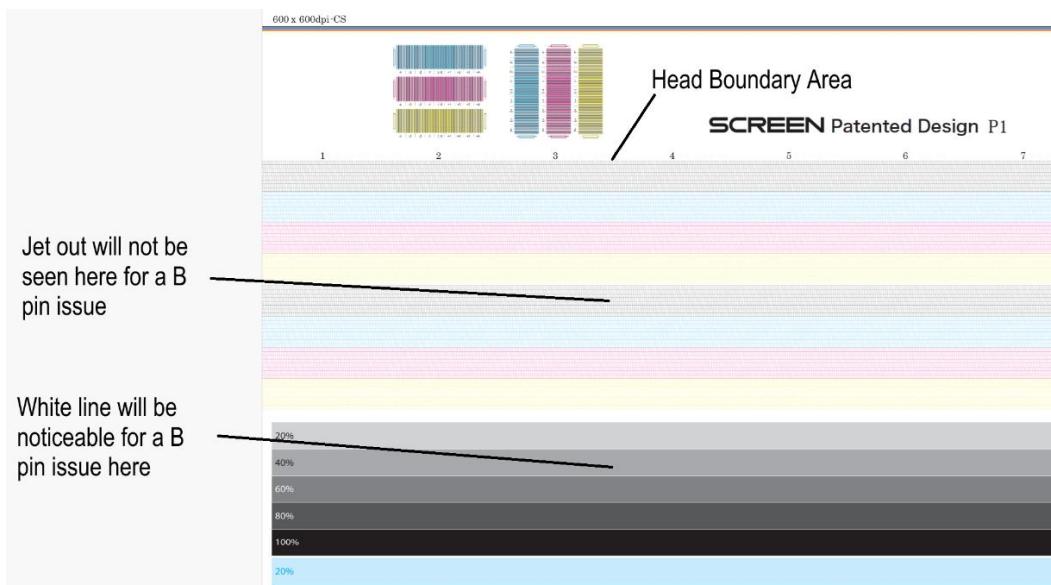


Head Cleaning Menu for Individual Heads. Use only **Normal** or **Intense** unless directed by Service

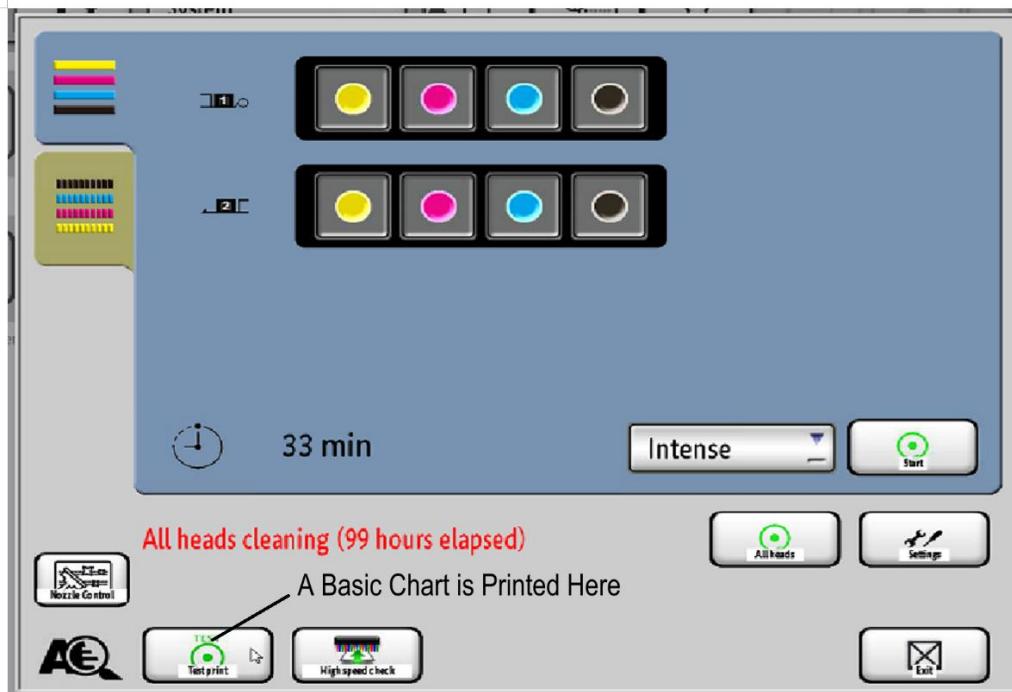


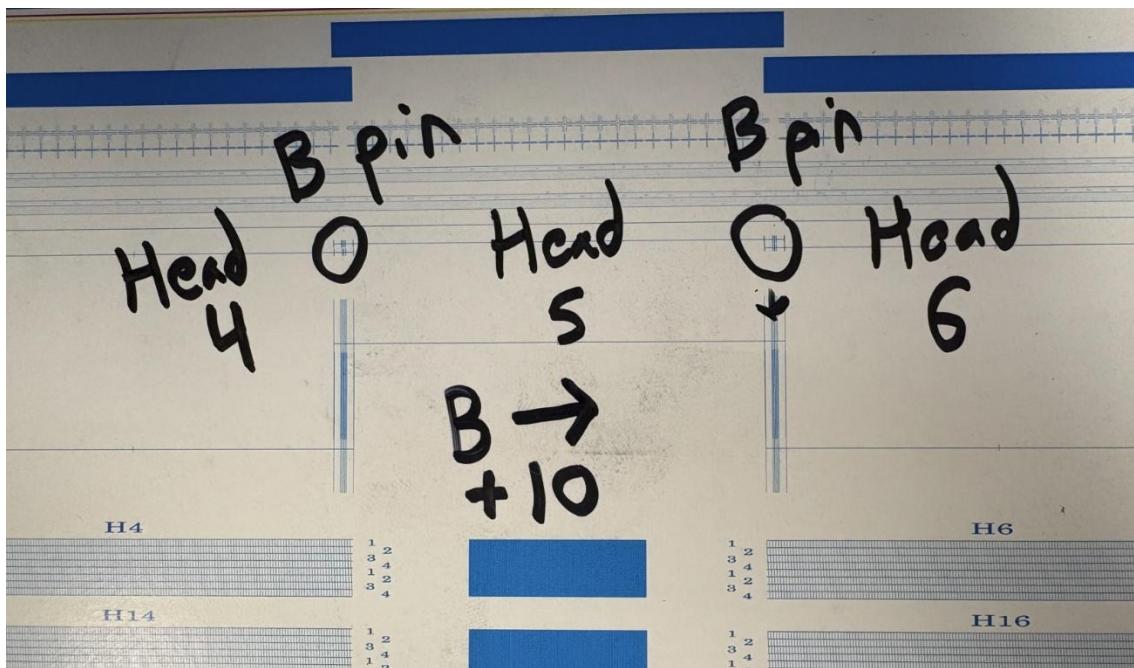
b. Head Boundary Issue (B Pin Adjustment)

- i. These voids can have the appearance of Jet outs in jobs, in the Nozzle Checker area of the Custom Flushing Page they are not visible. They can be seen in the shading area where a head boundary is as seen below:

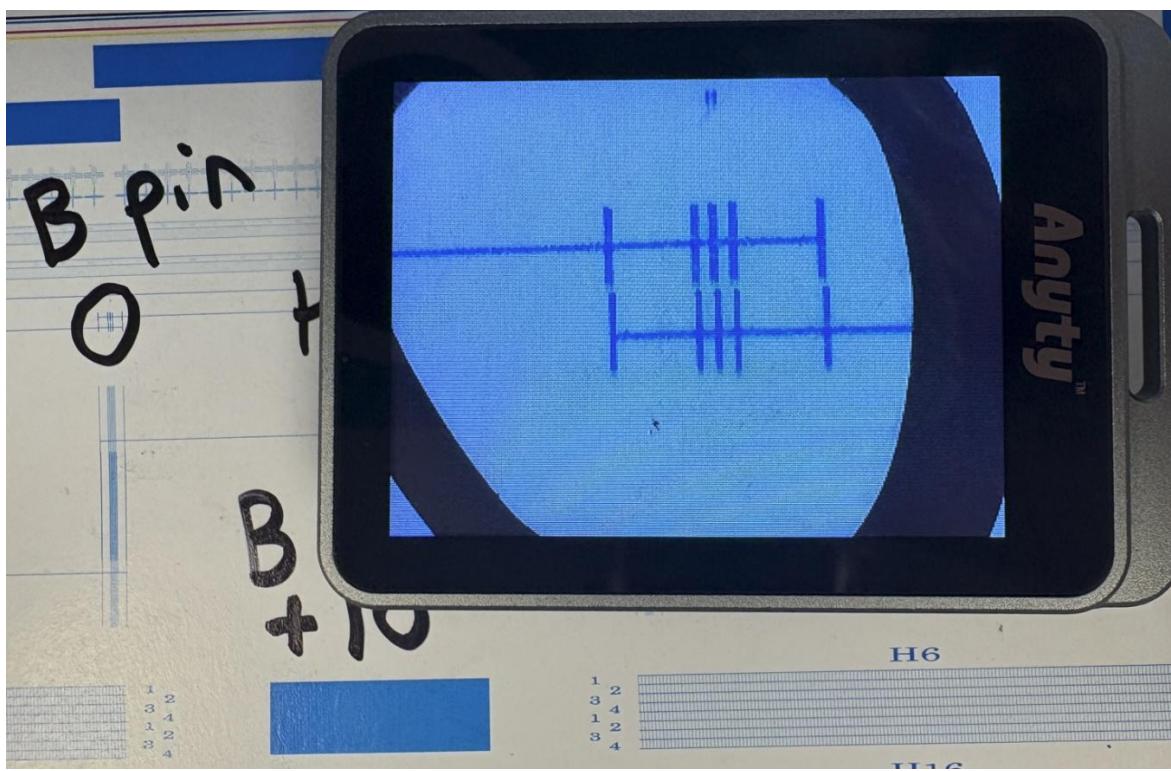


- ii. To verify the issue is a B pin, a Basic Chart must be printed from the Head Cleaning Menu to check the mechanical pinning of the suspected head. In the example below I use Cyan printhead 5.



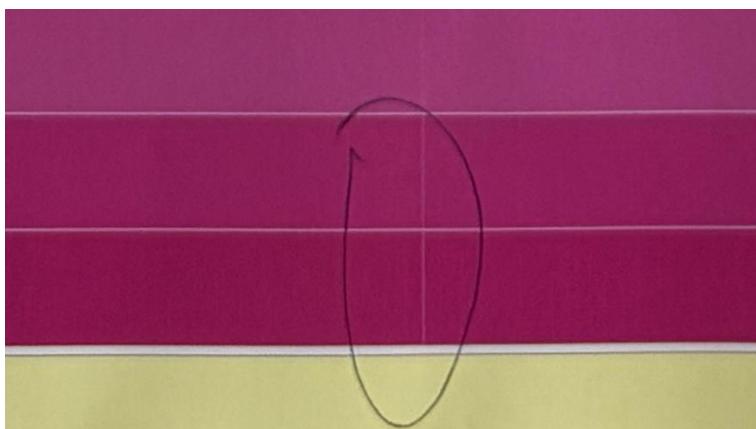
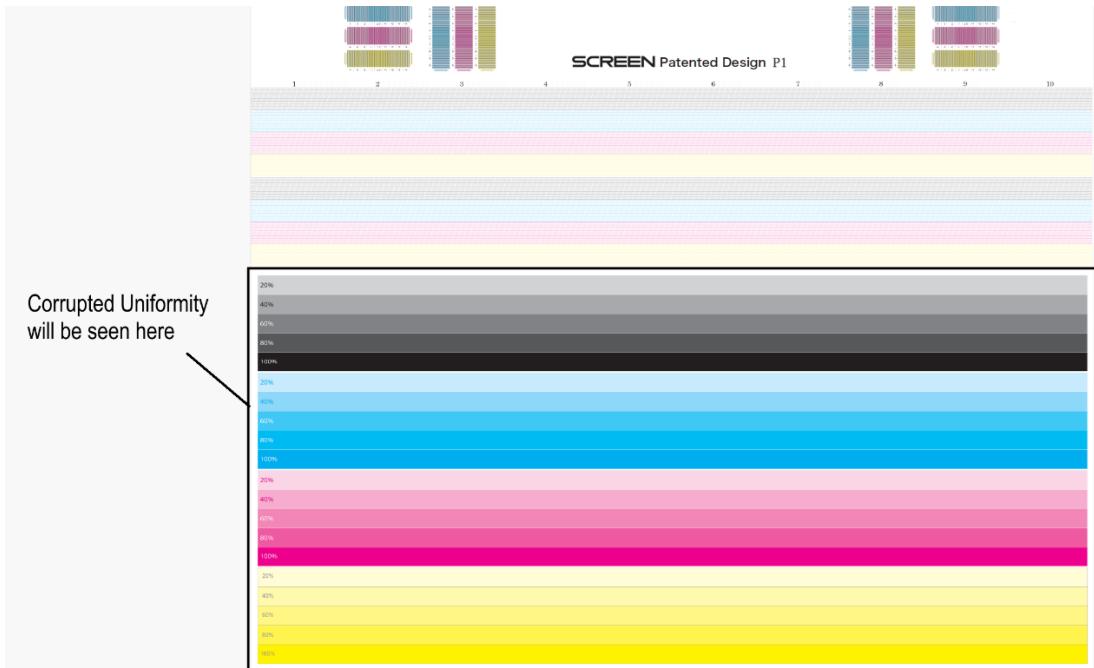


- iii. If the B pin looks like below in the area showing a void – the printhead must be mechanically repined. Once pinning is correct the lines should be directly on top of each other.

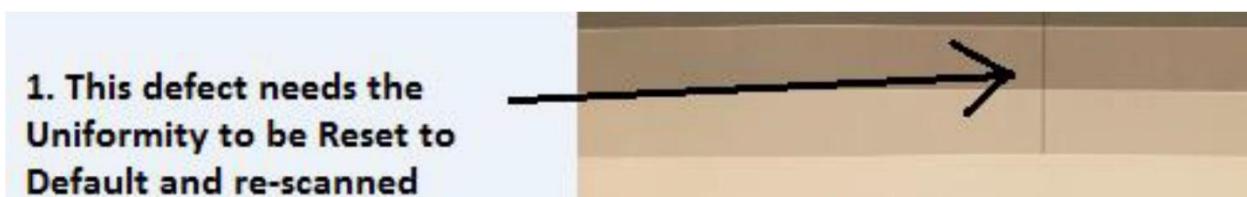


c. Corrupted Uniformity (Jet Inspection Created with too many Jetouts)

- i. This issue occurs when a Uniformity is created and there are too many jet outs in the print. The created Uniformity will then create streaky print which can appear as jet outs in the area shown below:

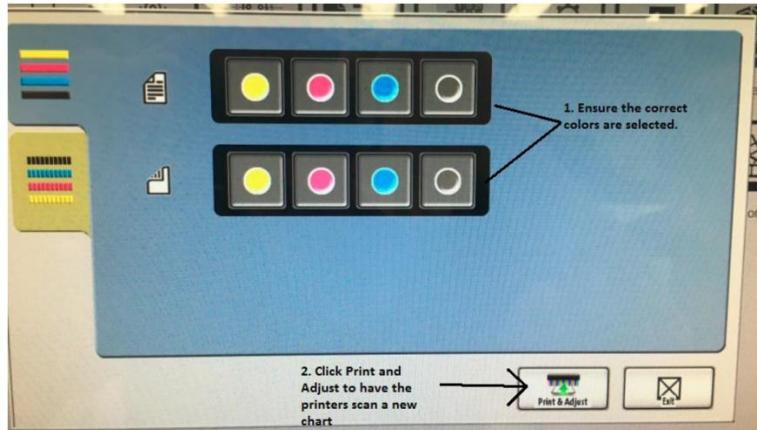
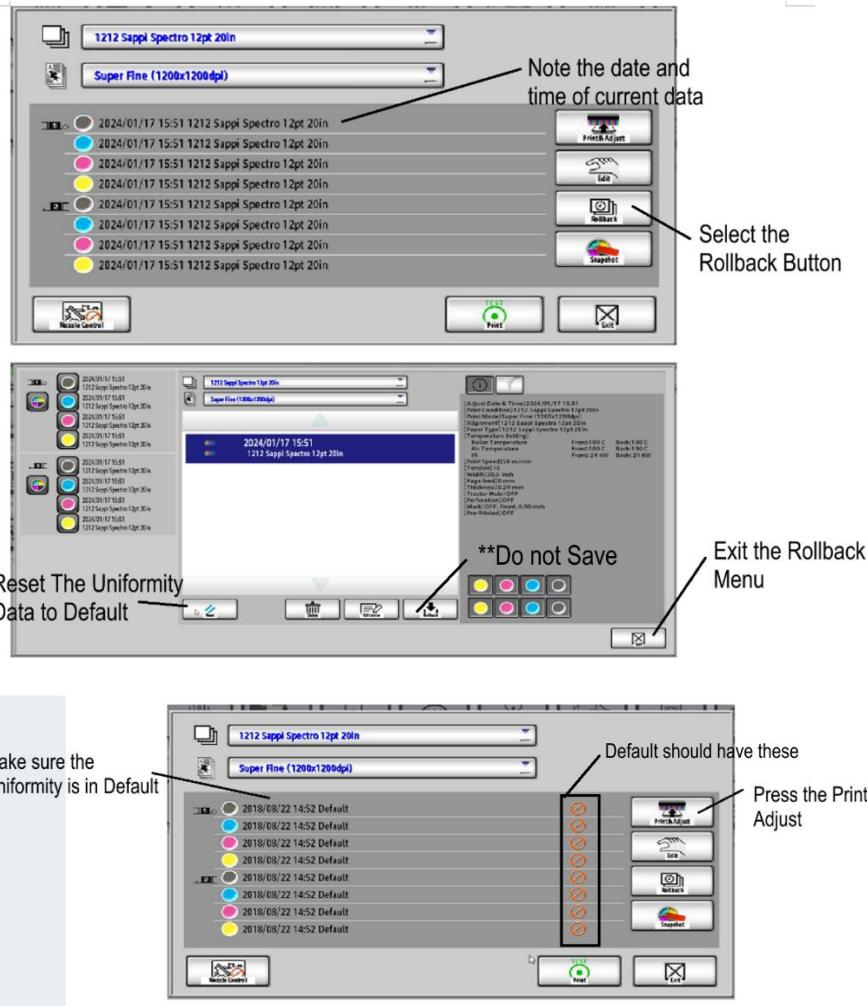


- ii. Corrupted Uniformity can be voids or dark streaks. They are not Jet outs. The jet outs that caused the bad Uniformity might now be cleaned but the bad Scan data must be deleted and recreated.



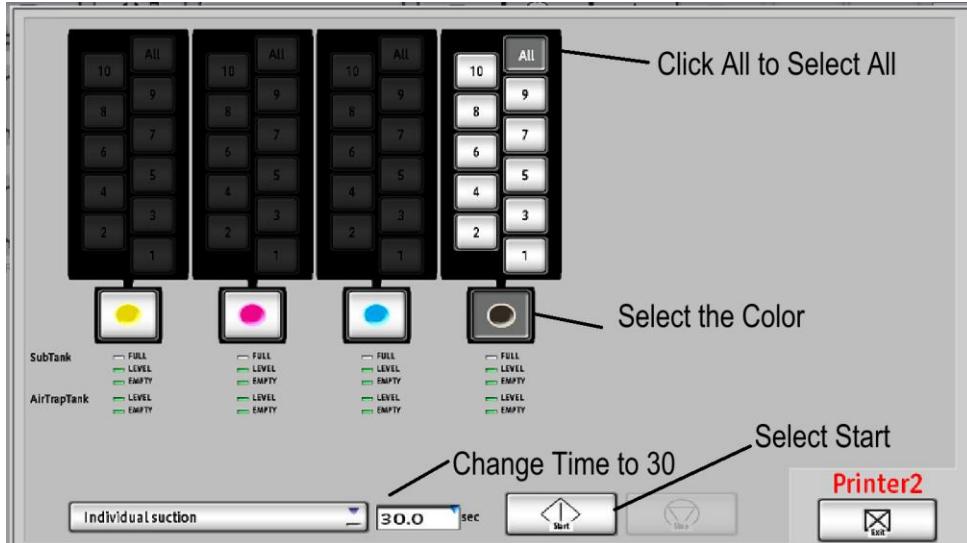
1. This defect needs the Uniformity to be Reset to Default and re-scanned

iii. To correct a corrupted Uniformity please perform the following steps shown below to Reset the Uniformity to Default and Create a New Uniformity.

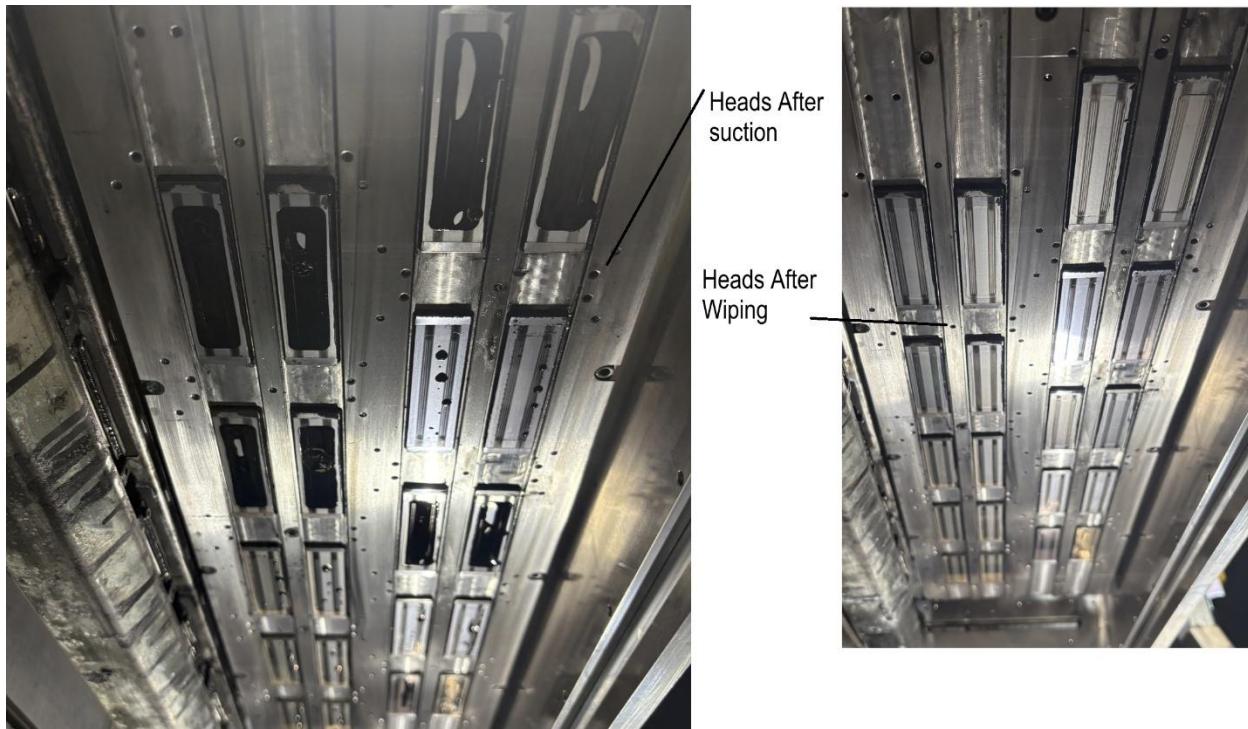


** For Glossy, Matte, & Silk papers Print & Adjust a second time after saving initial data.

- d. Heads were uncapped and there many missing nozzles on many heads
- Perform a 30 second individual suction as seen below in the Ink Supply Menu. **** NOTE**** If the issue is on Printer 1 then Individual suction must be performed from the Ink Supply Menu on Printer 1

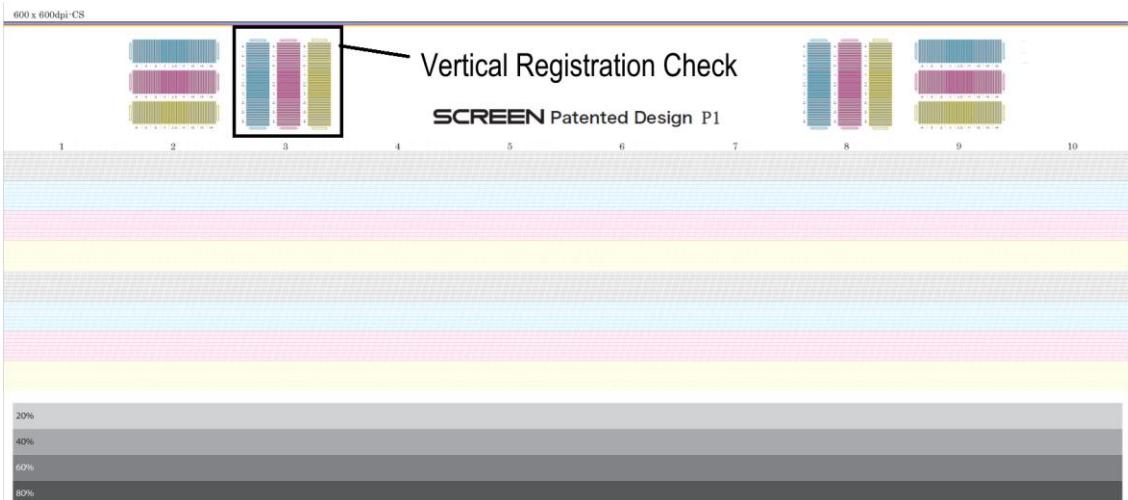


- To verify proper Individual Suction the following should be observed:
All heads should have ink on the surfaces after suction, then the wiper should remove all of the ink drips from the heads as seen below

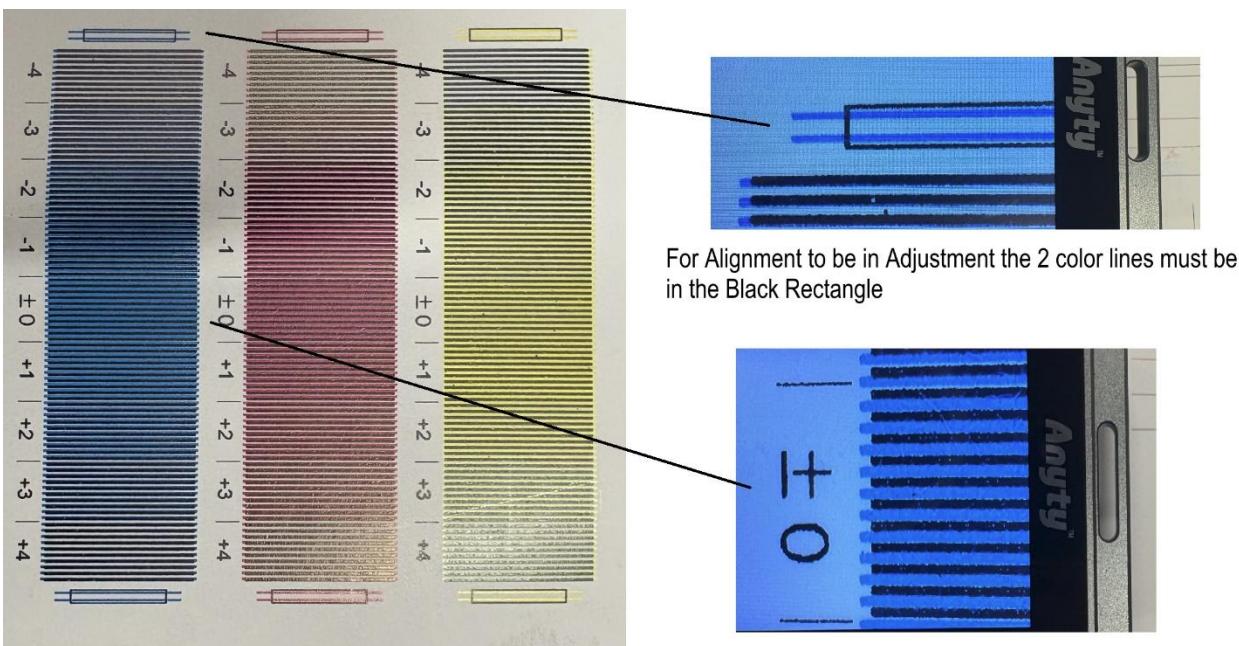


- Perform a Normal Cleaning before checking the Job or Chart

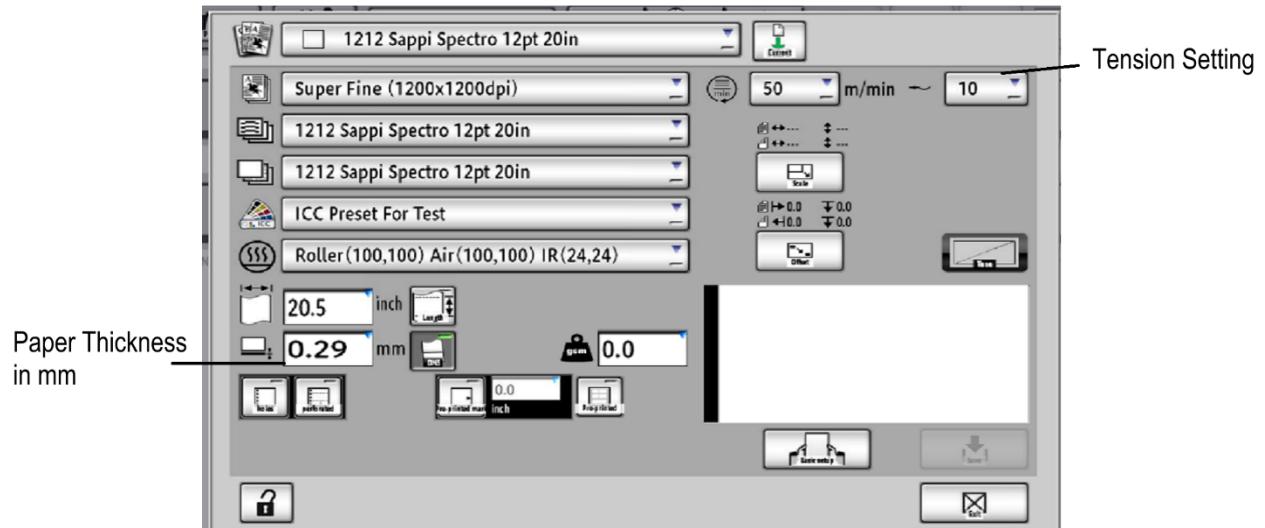
2. Vertical Color Registration



The Registration Scale should appear as seen below in the Custom Flushing Page when the Alignment is correct.



- a. Paper Thickness or Tension Setting Is Correct in the Print Condition Menu
 - i. Verify the paper thickness and tension by checking in the Print Condition Menu



- ii. If paper thickness is in doubt use a Digital Micrometer to verify in mm.
If Tension is in doubt place a call to Screen Service to verify settings.



- b. Print Condition that is loaded does not match the Print Condition in the Job
 - i. If a Job is printed and the Print Condition does not match the Alignment, Uniformity, and Color data will be incorrect. **** Always Verify this before printing****

RIP VERSION: 6	
8125_test1 1206 Willamette Capistrano Matte 60lb_75m Created: 2025/05/28 09:06:46 (Backlog) DataSize:--	Never Print a Job if the Print Condition is RED
DS_Card_100_pages_(1) 1212 Sappi Spectro 12pt 20in Created: 2025/05/27 11:10:08 (Backlog) DataSize:--	Only Print Jobs where the Print Condition is Black

- ii. The only way to correct this issue is to either load the correct Print Condition on the Printer or Re-Rip the Job with the correct Print Condition

c. Wavy Paper

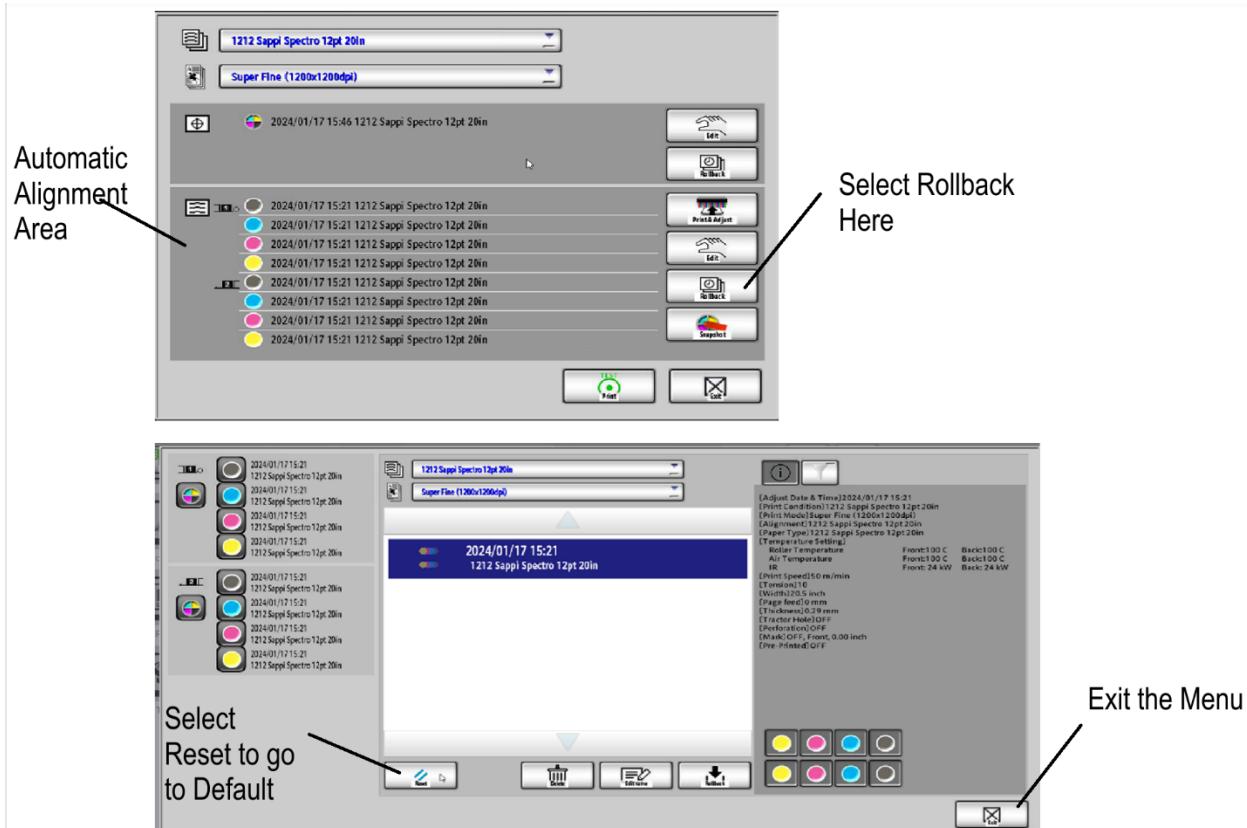
- i. If Paper is wavy going under the Printhead Carriages, it will cause the paper to appear out of register.



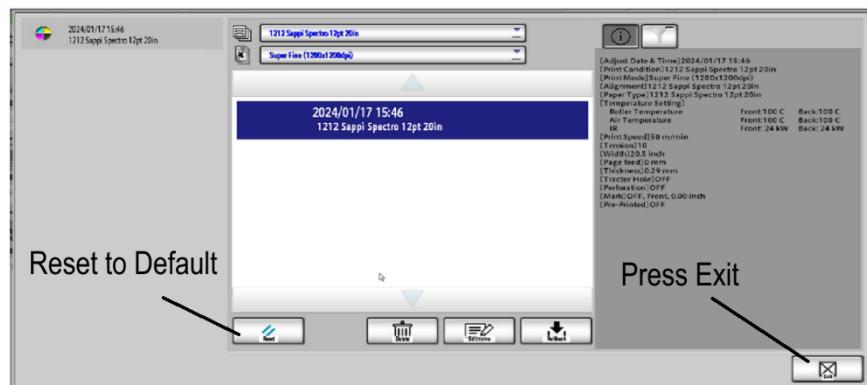
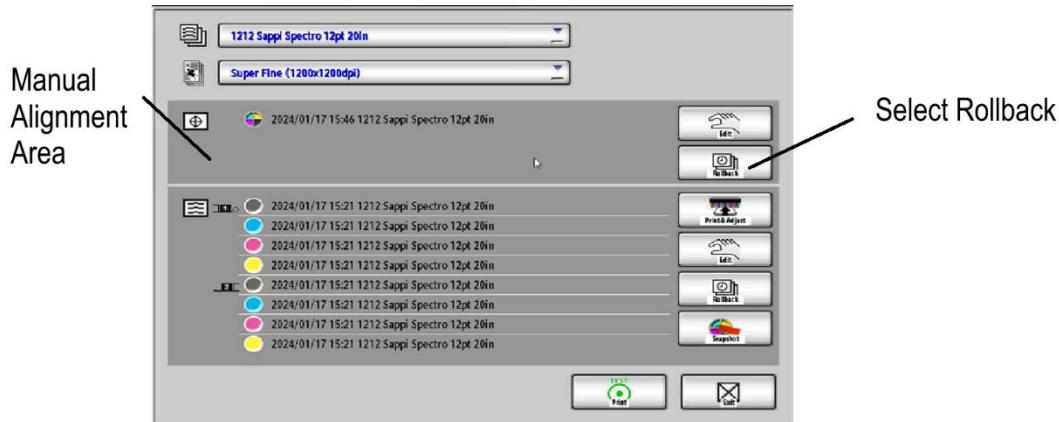
- ii. If Alignment was created with Wavy Paper, the paper may now be flat, but the Alignment Data will be corrupt. See the next section for how to correct this issue.

d. Corrupted Automatic Alignment (JI Scan)

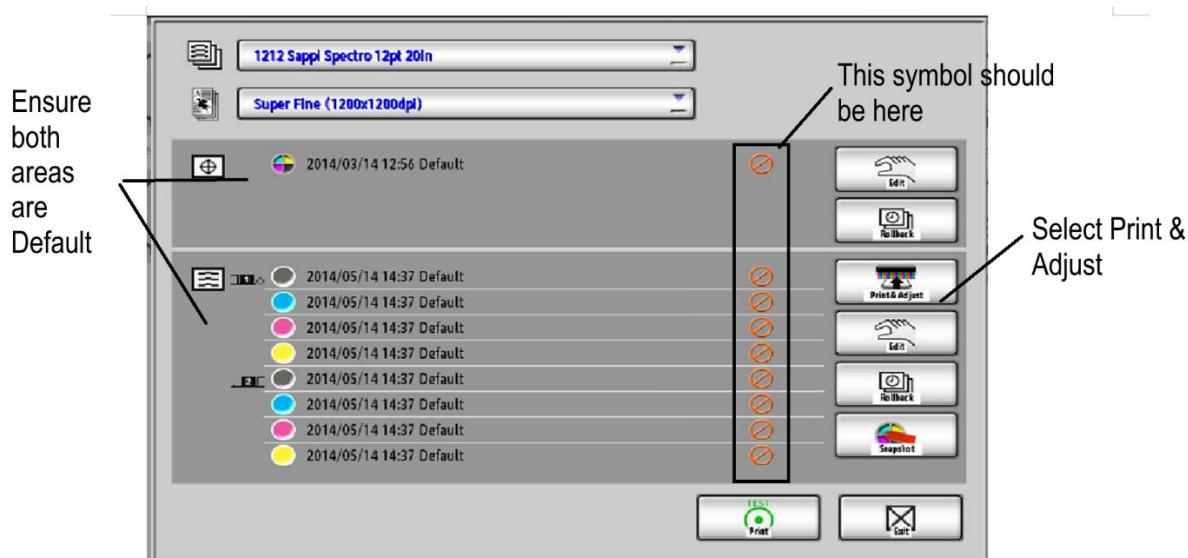
- i. When Vertical Registration is in Doubt it is best to run a new Alignment from Default as seen below from the Alignment Menu:



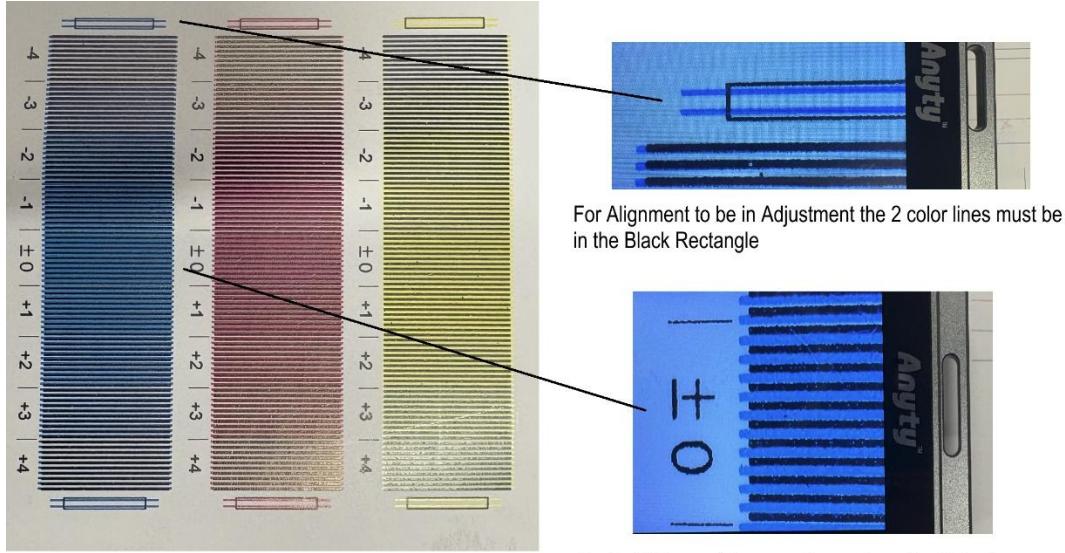
- ii. Next reset the Manual Adjustments to Default also as seen below in the Alignment Menu:



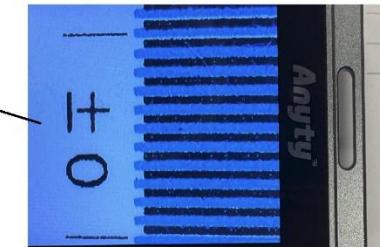
- iii. A new Alignment can now be created from Default. Ensure paper is not Wavy and the Thickness and Tension are correct.



iv. Save the Alignment Data with a new name upon completion and check your Vertical registration in the Custom Flushing page again



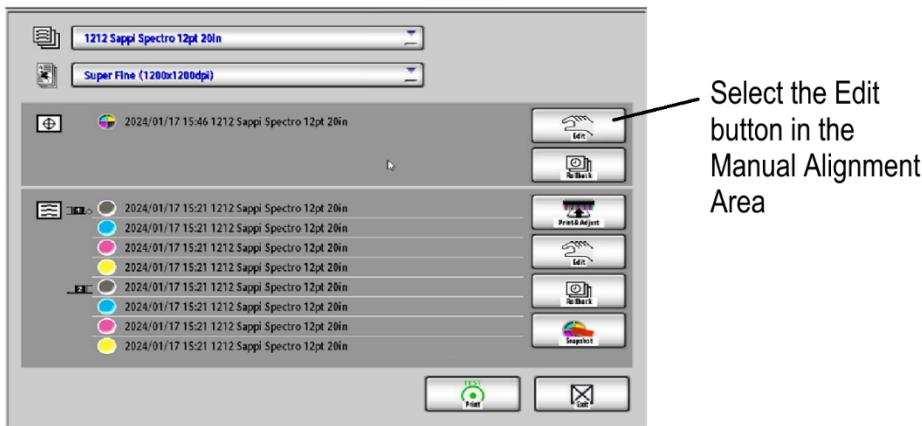
For Alignment to be in Adjustment the 2 color lines must be in the Black Rectangle



Perfect Alignment is seen above where the Color lines are exactly in the middle of the Black lines

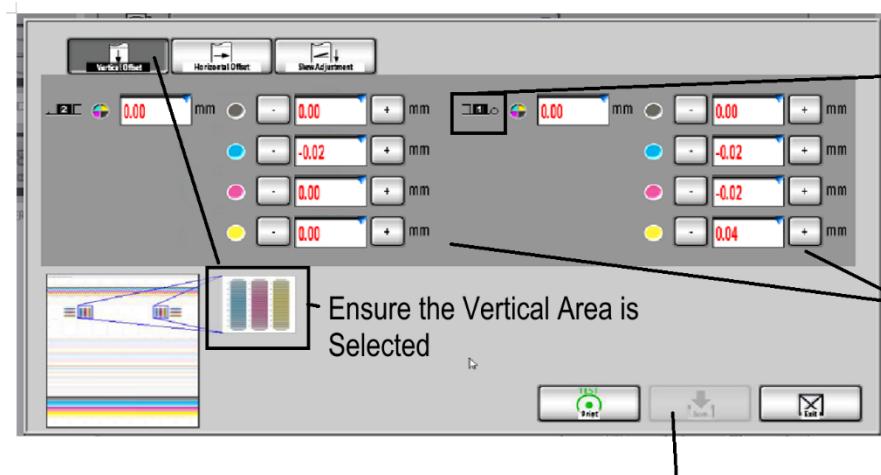
e. Corrupted Manual Alignment Adjustments for Vertical (Input from operator)

- If further Vertical adjustments are needed, enter the Alignment Menu again and manually adjust the new Alignment to get the patterns to appear as seen above





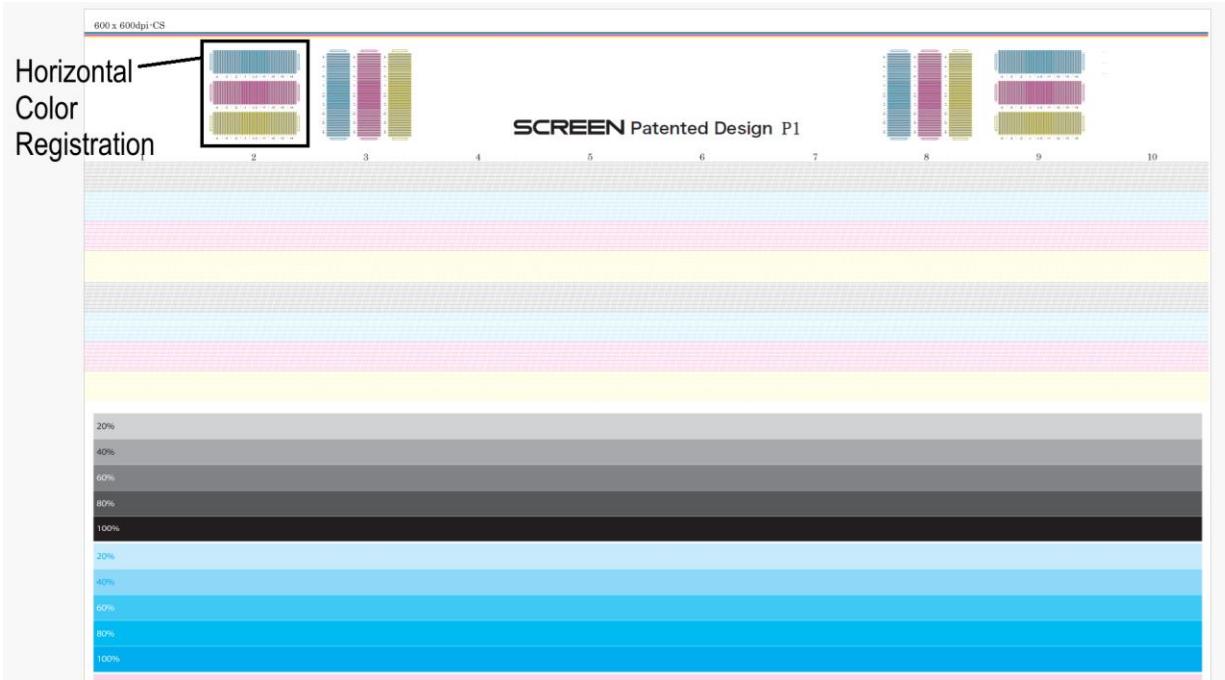
Cyan would need to have the - Button pressed 4 times to correct the Alignment in the Manual Edits



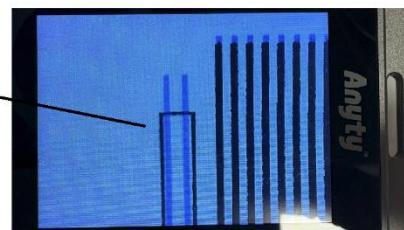
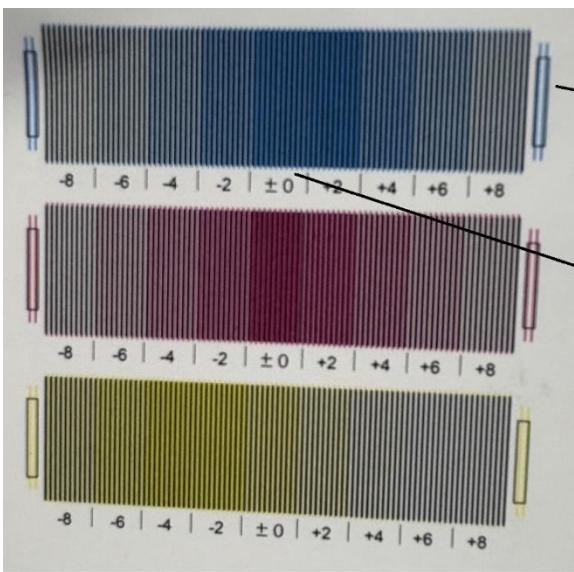
Save Data and
Print again to
verify results are
good

- ii. If the numbers are too large in Manual Alignment Menu, then there is most likely some other issue. Check Paper Thickness in the Print Condition. When in doubt Roll Back the Automatic Alignment Data to Default and start over.

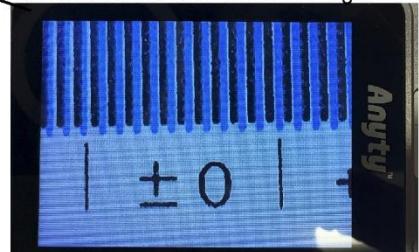
3. Horizontal Color Registration



The Registration Scale should appear as seen below in the Custom Flushing Page when the Alignment is correct.



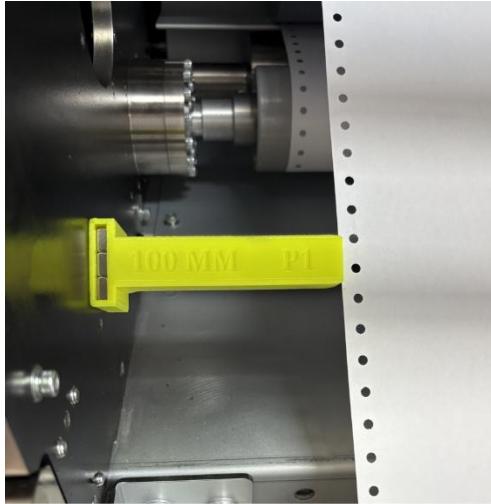
For Alignment to be in Adjustment the 2 color lines must be in the Black Rectangle



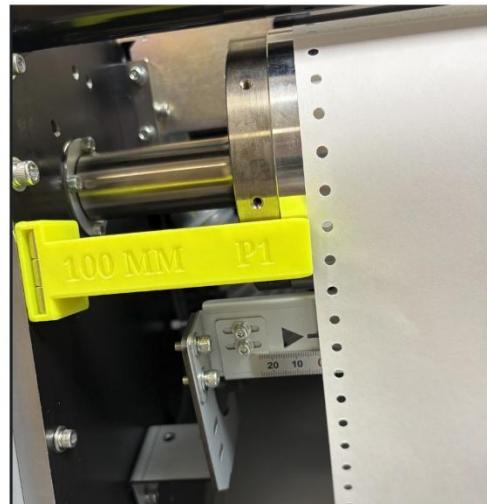
Perfect Alignment is seen above where the Color lines are exactly in the middle of the Black Lines

a. Paper tracking incorrectly through the press

- i. Check the paper tracking in Printer 1 as seen below

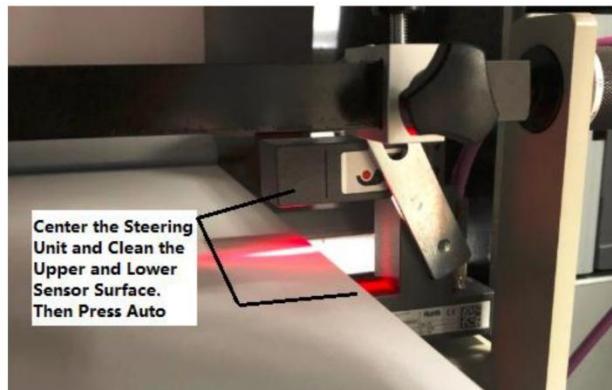
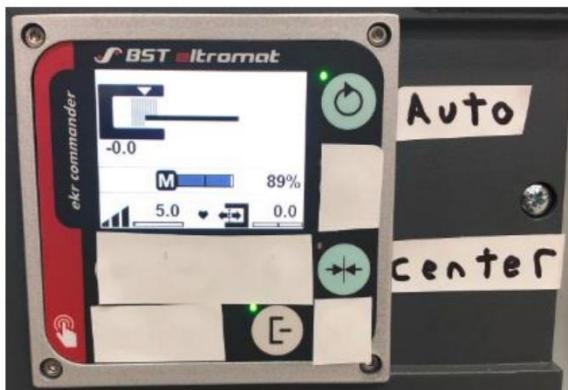


Before Steering Unit: Paper should be 100mm off of the Printer Frame exiting the Unwinder and coming into the Press

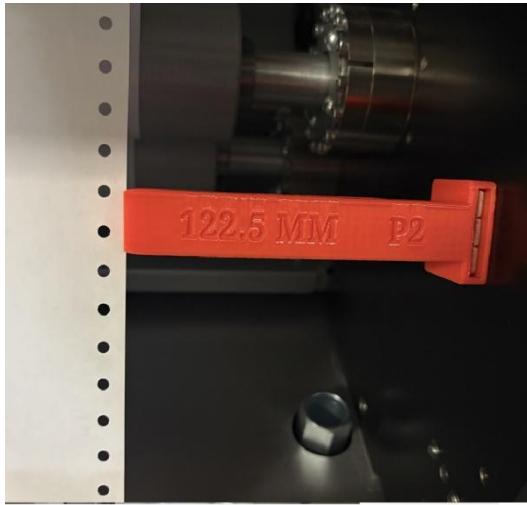


After Steering Unit: Paper should be 100mm off of the Printer Frame at the ruler and splitting the Red Zero

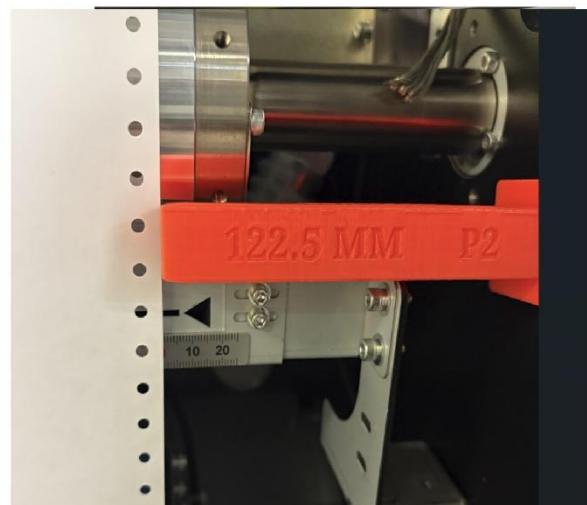
- ii. If the paper is incorrect coming off of the Unwinder, reposition the paper roll on the Unwinder core to track in at 100mm
- iii. If the paper is incorrect at the ruler, clean the Steering Sensor as shown below before adjusting the steering dial. 1. Center the steering unit to prevent the web from breaking. 2. Clean the sensor surface with a lint free cloth. 3. Auto the steering unit and feed paper to recheck paper tracking. 4. If paper is still not at 100mm adjust the dial slowly to get paper to the correct position.



iv. Check the paper tracking in Printer 2 as seen below

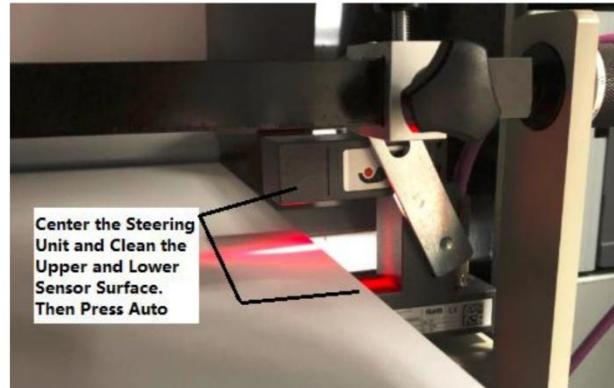
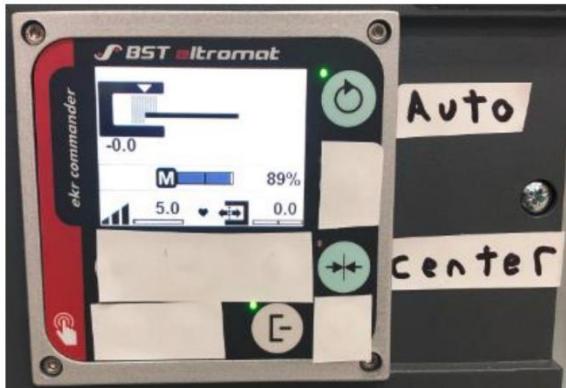


Before Steering Unit: Paper should be 122.5mm off of the rear Printer Frame coming out of the chiller rollers



After Steering Unit: Paper should be 122.5mm off of the rear frame splitting the red zero on the back ruler

- v. If the paper is incorrect at the lower position, call Service before adjusting the Turnbar.
- vi. If the paper is incorrect at the ruler, clean the Steering Sensor as shown below before adjusting the steering dial. 1. **Center** the steering unit to prevent the web from breaking. 2. Clean the sensor surface with a lint free cloth. 3. **Auto** the steering unit and feed paper to recheck paper tracking. 4. If paper is still not at 100mm adjust the dial slowly to get paper to the correct position.



b. Wavy Paper

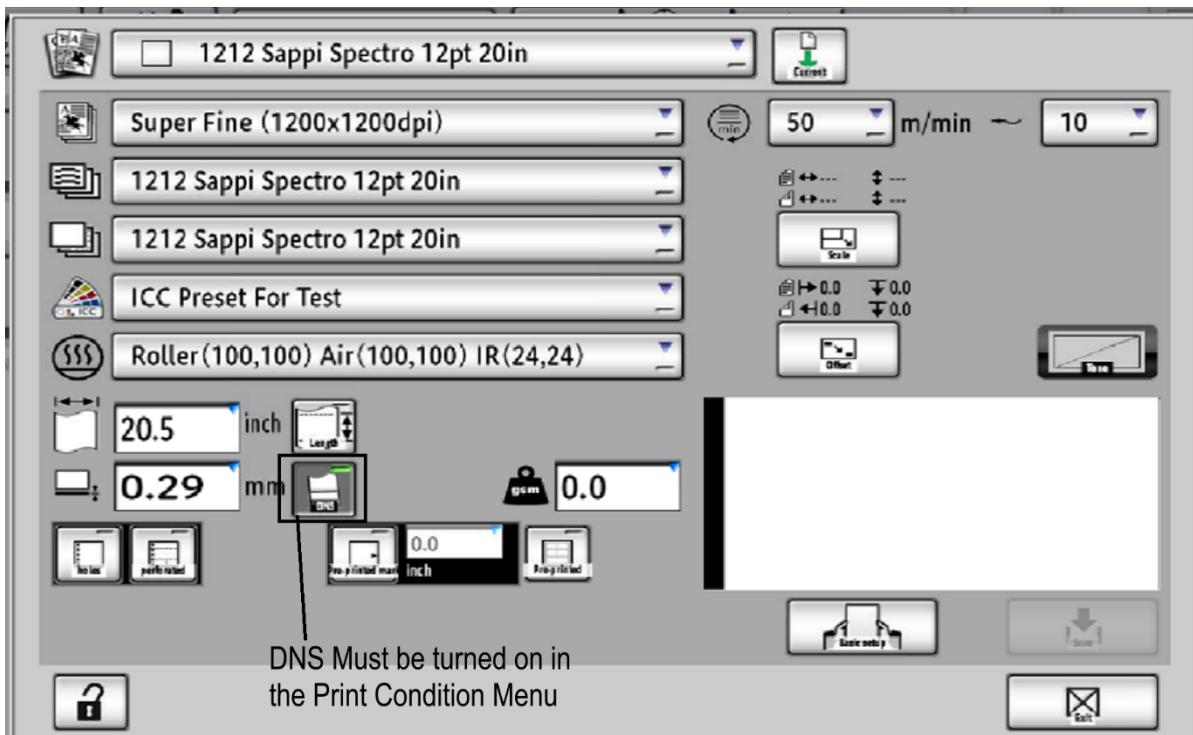
- i. If paper is wavy going under the Printhead Carriges, it will cause the paper to appear out of register.



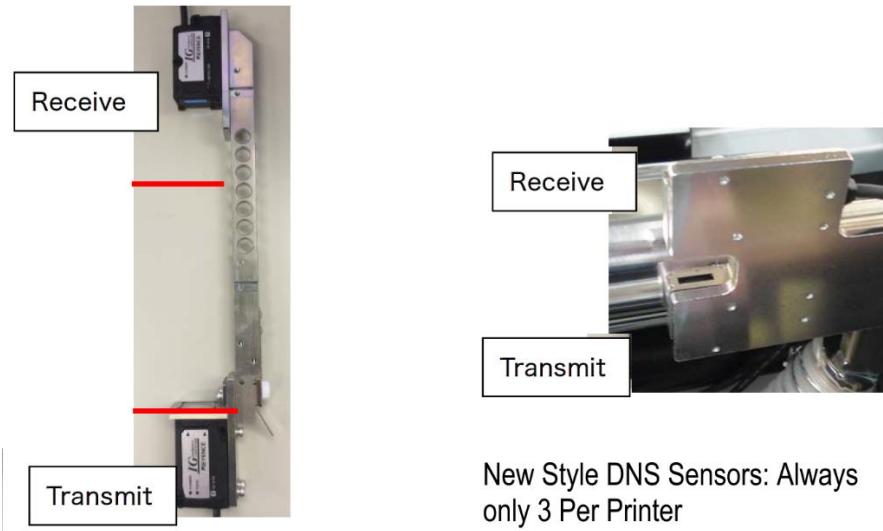
- ii. Wavy paper can also cause the DNS sensors to show warning messages that the paper position is not correct. See the next section for checking the DNS sensors

c. DNS Sensors are Dirty or Paper Tracking Under the Sensors is Incorrect

- i. DNS must be turned on in the Print Condition Menu unless instructed otherwise – ex – Tractor hole paper



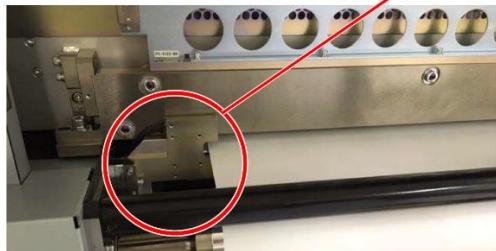
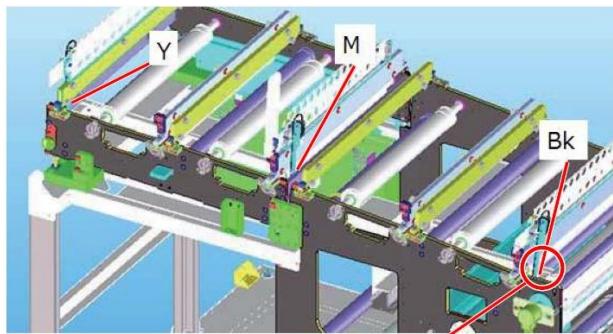
- ii. DNS Sensors will be as shown below:



Old Style DNS Sensors:
Either 3 or 5 per Printer

New Style DNS Sensors: Always
only 3 Per Printer

- iii. There are 3 possible DNS configurations. Printer 1 sensors are on the operator side of the paper; Printer 2 sensors are on the gear side. Follow the procedure for the sensors that are installed.
- iv. Oldest style has 5 sensors per printer in the following locations: Before black, between black and cyan, between cyan and magenta, between magenta and yellow, and after yellow.
- v. Next oldest has 3 sensors per printer in the following locations: Before black, between cyan and magenta, and after yellow
- vi. The newest has a new design and are located in the following locations: Before black, between cyan and magenta, and after yellow



- vii. If the sensors are clean and the paper is tracking correctly the following numbers should be seen in the DNS display screen. Old – Close to 5.00, New – close to 3.50 **NOTE** always check DNS displays while the paper is feeding or the values will not be correct



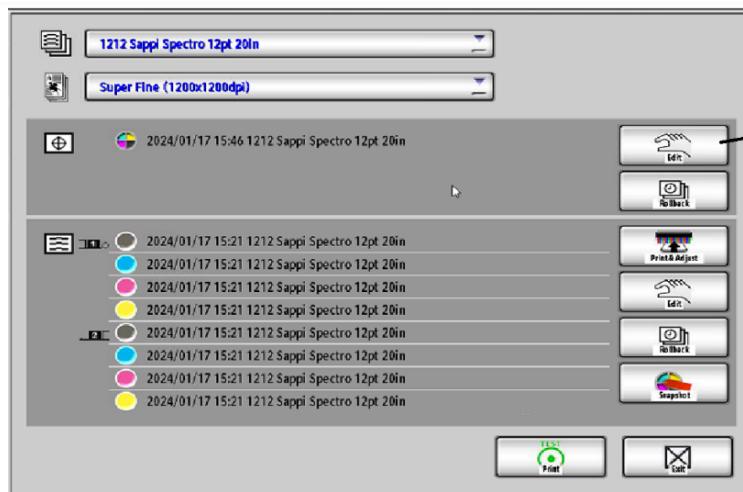
Old Style - Each sensor has its own display. There will be 3 or 5. All sensors should be reading close to 5.00 when the sensors are clean and paper is tracking correctly.



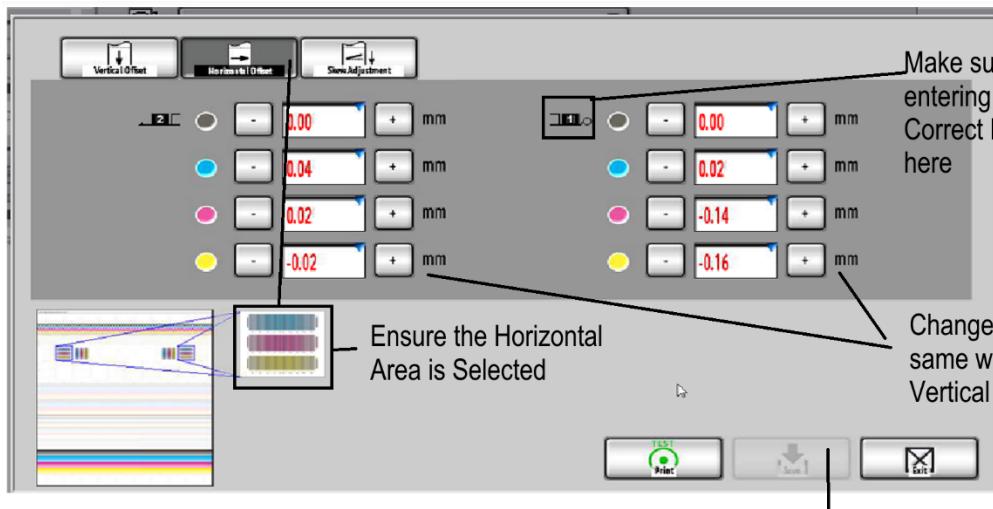
New Style - The 3 sensors share a display. Channel 1 stays in the top. Channels 2, 3, and 4 cycle through the bottom. Channel 4 does not exist and shows the reference of 3.5 which is where the sensors should be if they are clean and the paper is tracking correctly

d. Corrupted Manual Alignment Adjustments for Horizontal (Input from Operator)

- i. If further Horizontal adjustments are needed, enter the Alignment Menu again and manually adjust the Horizontal values to get the patterns to appear correctly in the Custom Flushing Page
- ii. Note that if DNS is being used it will be adjusting the print before the Manual Adjustment Data is entered. **ALWAYS MAKE SURE DNS IS CORRECT AND PAPER TRACKING IS CORRECT BEFORE ADJUSTING THESE VALUES**



Select the Edit button in the Manual Alignment Area

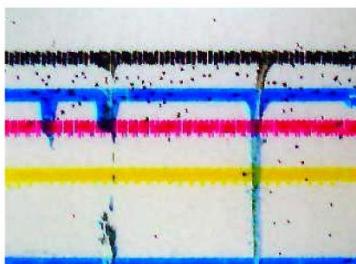
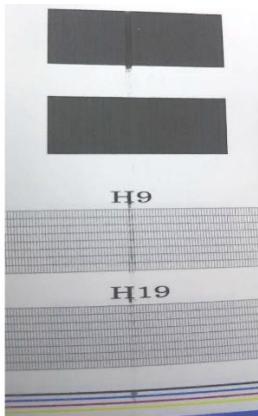


Save the Data and Print again to verify the results are good

4. Streaks From Drags on the Page

a. Dried Ink or Paper Hanging from the Printhead Array

- i. This is the most common occurrence that causes streaks. If the Cap Stamp pads are not wet daily, then ink will begin to dry and transfer.

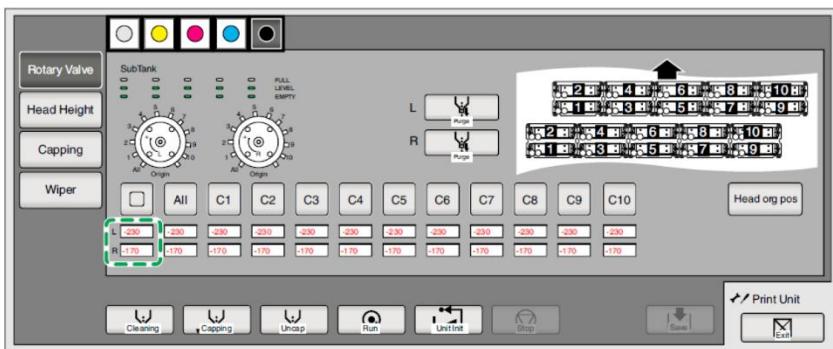


Sample 2
Ink accumulates on the surface of Cyan head.
In this case, dirt may be occurred not only in Cyan but in Black.
Because, when Black line which has not got dry touch to solid of ink on the Cyan head,
Black line will spread. From this reason, Magenta line and Yellow line does not spread.
For example, if dirt occurs same as left photo in Black line, Cyan line and Magenta line,
surface of Magenta head may be dirty.

- ii. To access the Printheads for cleaning perform the following steps

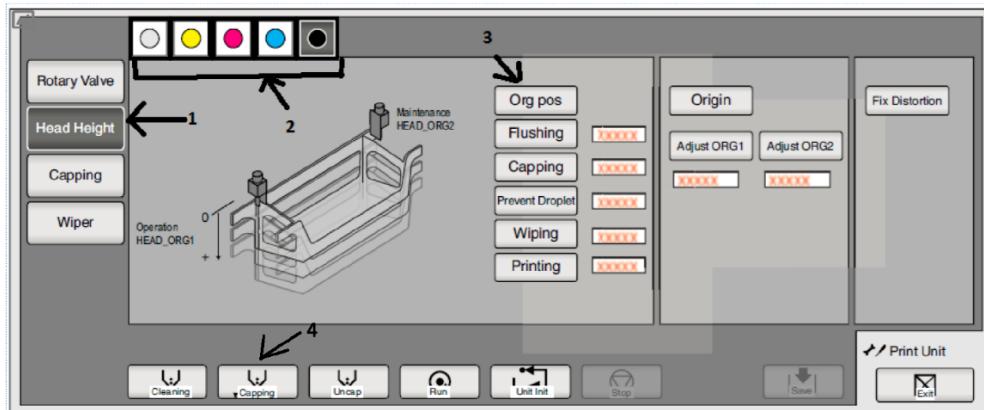


Once the **Print Unit** button is pressed, the following screen will appear:



This is the default screen every time that the **Print Unit** menu is exited and re-opened. This is important because if any color head is being worked on, the screen will always open with Black selected as seen above.

To gain access to the Printheads, perform the following: 1. Click on the **Head Height** tab 2. Select the color head you wish to access from the top 3. Click the **Printing Button** to drop the printhead assembly down for easy cleaning. 4. Click **Capping Button** when finished to Recap the Heads (see picture below)



b. Buildup on Flushing Sponges (Under the Printheads)

- Check these pads and trays for excessive ink pooling or dried ink on the sponge surface. This will push the paper upwards into the Print Heads causing streaks and drags



c. Paper Dragging on NIR Dryer Due to Clogged Filter

- If the filter in the front dryer door becomes too clogged with dust, the paper can be pulled into the NIR Dryer and drag on the surface shown below. All colors will drag when this occurs



5. Nozzles Dropping Out While Printing

a. Static on Paper – Too Little Humidity



Static can cause the ink to dry on the nozzle surface while printing is occurring

Fig 1. The photo of the nozzle surface

- i. This situation occurs when the paper is too dry running under the Printhead Array. This will most likely occur in Black on Printer 2. Check the Humidity by looking at the GUI Printer icon seen below:



Printer 1 and Printer 2 Humidity reading is shown here. Values under 30 can lead to static discharge on the printheads leading to jet outs.

- ii. To fix this situation the room humidity must be increased, or Static Tinsel can be placed on the paper to discharge before the Printhead arrays

b. Moisture in Paper – Too Much Humidity

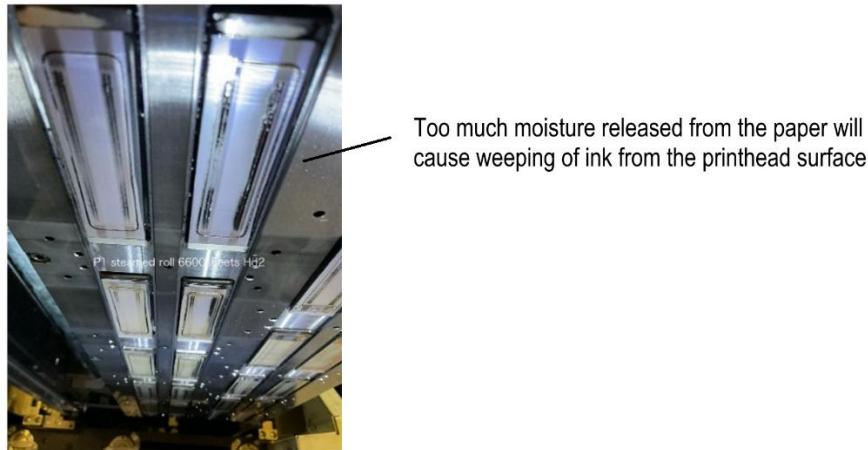
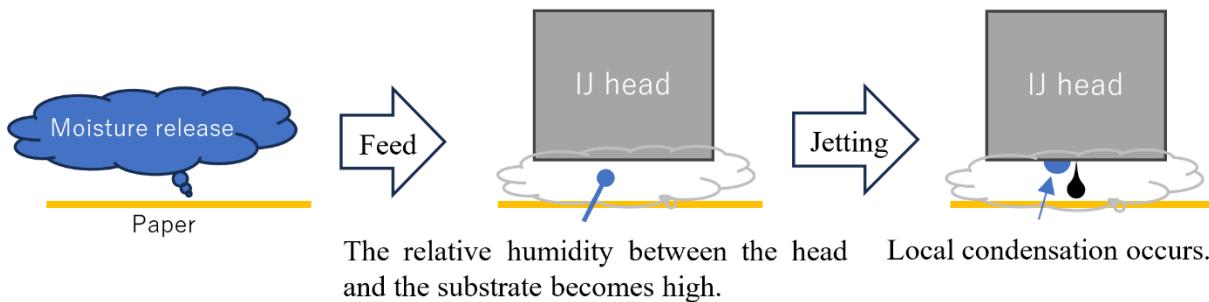


Fig 4. The photo of the nozzle surface with ink built up.

- i. When this situation occurs there is too much paper in the roll when it is fed into the printer. The only solution is to fix the room conditions or acclimatize the paper properly for at least 7 days to the room



The relative humidity between the head and the substrate becomes high. Local condensation occurs.

c. Ink Drips on the Printheads which Dry While Printing

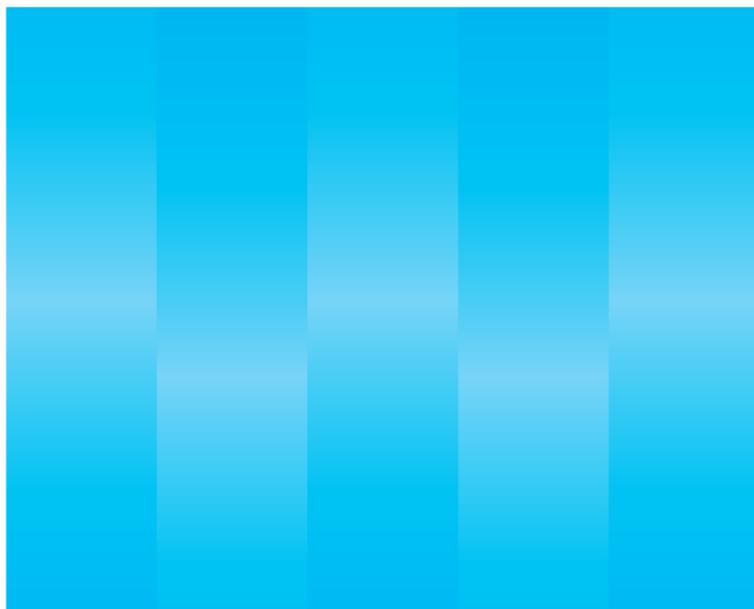
- i. This situation occurs if ink is left on the Printhead after a Printhead cleaning occurs. To check this situation, you must pull out the Printhead Array in question and watch the cleaning cycle as described in Section 1. Printheads should be wiped clean with no drips.

d. Inadequate Flushing Selected for Job Being Printed

- i. Nozzles can drop out if not enough flushing occurs during printing to keep them firing properly.
- ii. See the SC or SC+ Reference Guides for correct recommendation

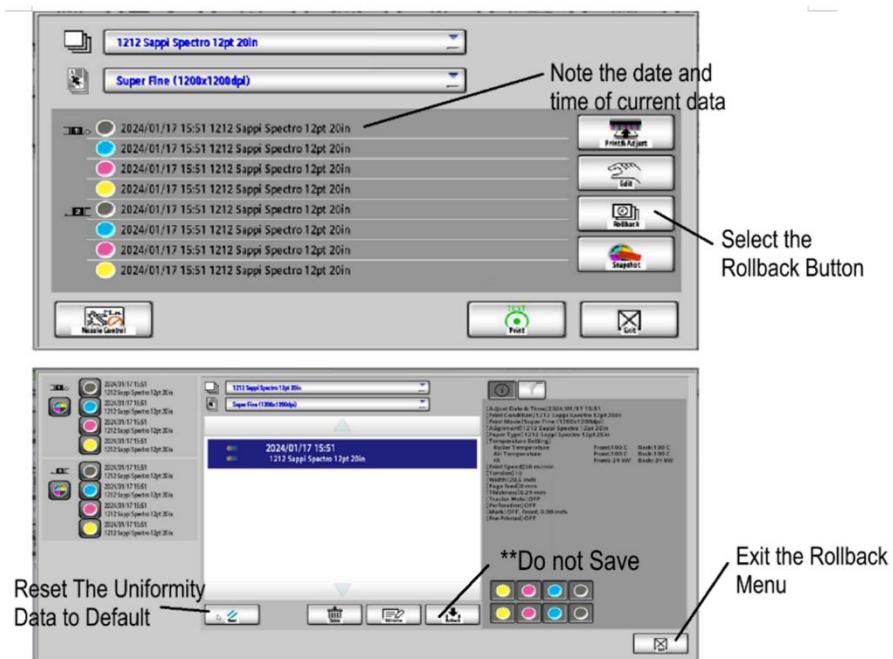
6. Density Shifting While Printing – Uneven Uniformity

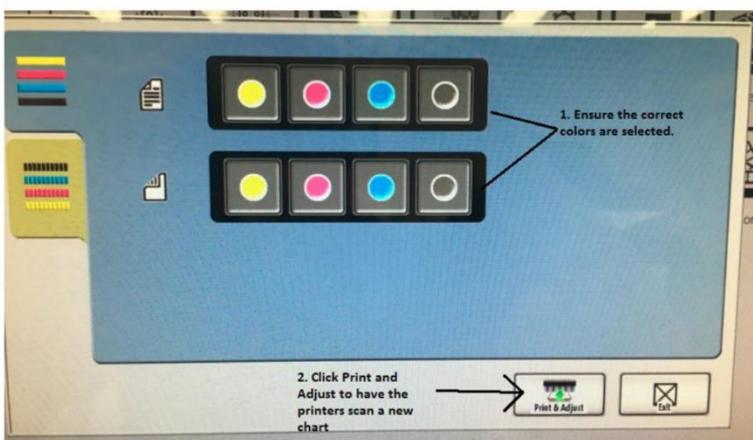
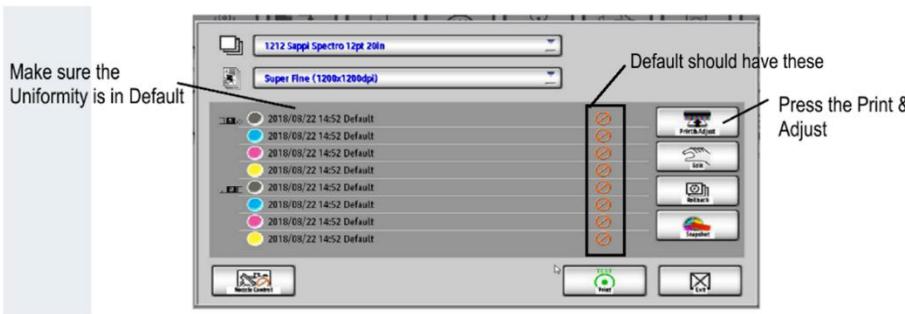
This is usually most noticeable in solid fill areas on the page as shown below:



a. Corrupted or Old Uniformity

- Reset the Uniformity to Default and create a new Uniformity as shown below. Ensure that the paper is not wavy and there are little to no jetouts present. Run 2x Uniformities from Default for Glossy, Matte, and Silk Papers

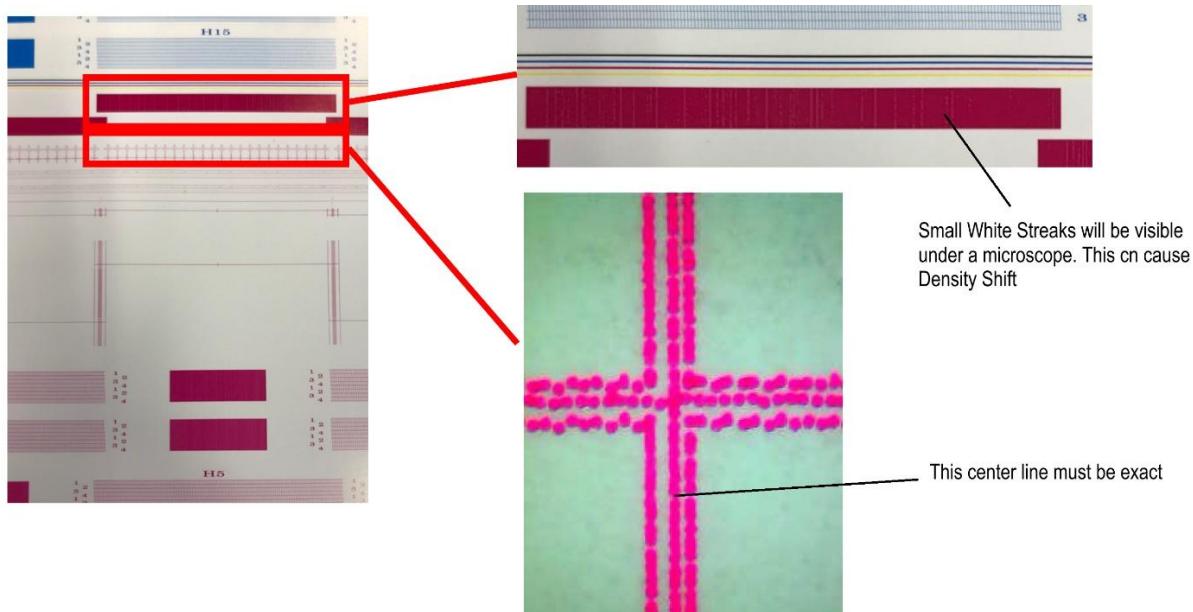




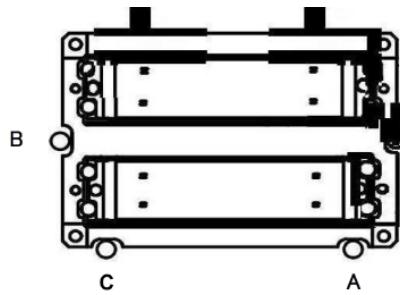
** For Glossy, Matte, & Silk papers Print & Adjust a second time after saving initial data.

b. Printhead A-Pin Adjustment is Out of Tolerance

- The A pins must be inspected in the **Basic Chart** which is printed from the **Head Cleaning Menu**. Issues may only be visible on Glossy papers due to ink saturation



- ii. Use the reference sheet inside of the printer door to verify the pins before further adjustment. Repin the head and check the **Basic chart** again



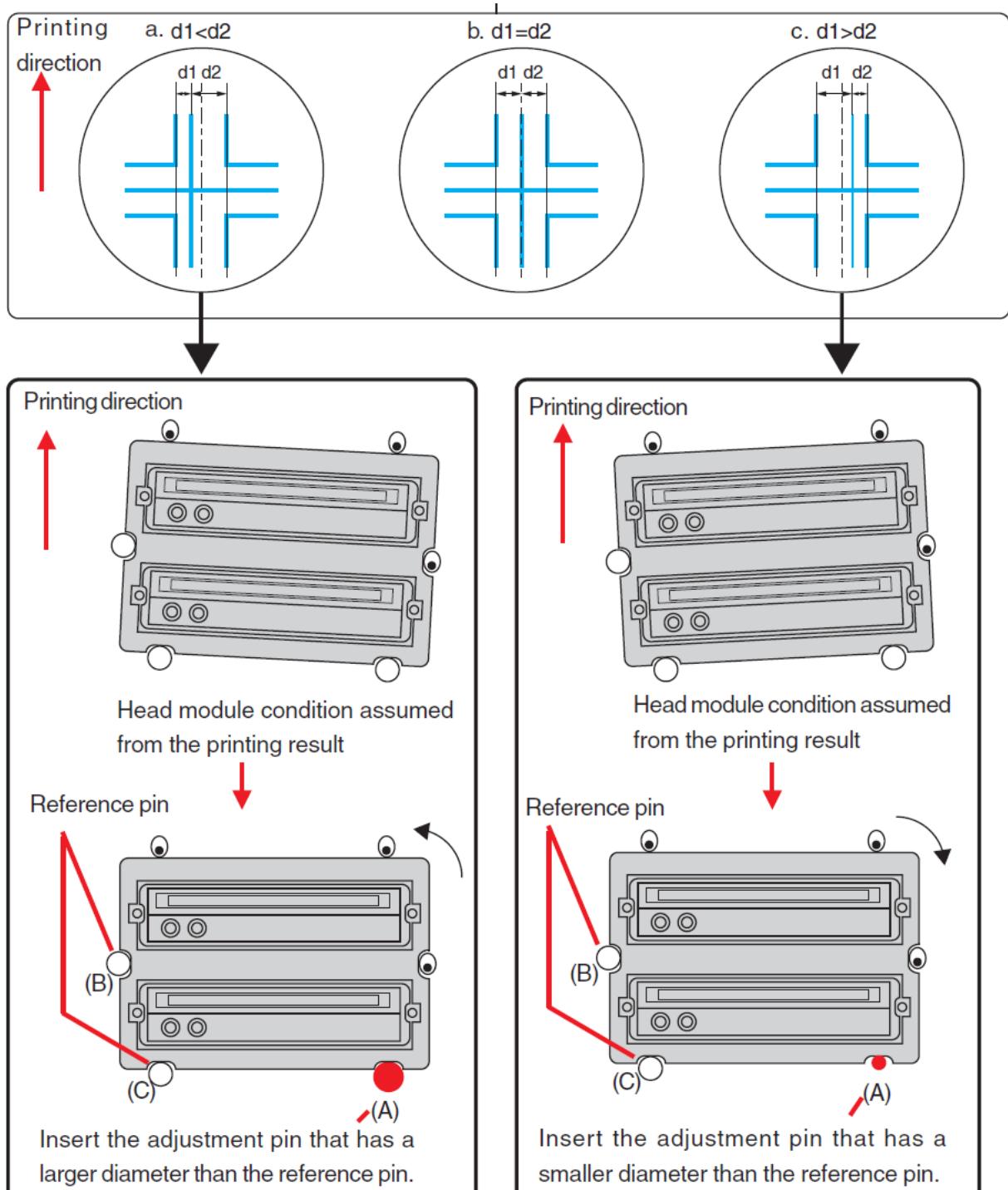
Start with the reference
A, B, and C pins noted
on the reference sheet
inside of the printer
doors

Head			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
BK	A	Shipped										
		E.C.Record 1										
C	A	Shipped										
		E.C.Record 1										

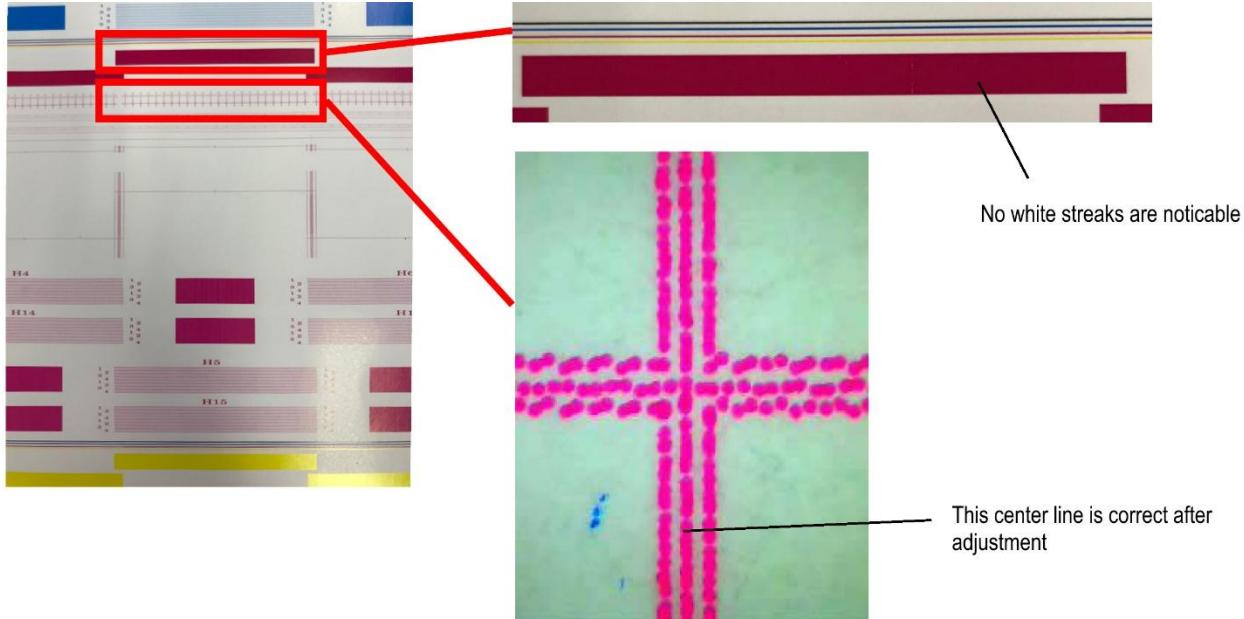
Head			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
BK	B	Shipped										
		E.C.Record 1										
C	B	Shipped										
		E.C.Record 1										

Head			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
BK	C	Shipped										
		E.C.Record 1										
C	C	Shipped										
		E.C.Record 1										

iii. To correct the issue seen above, the Printhead A pin must be adjusted as shown below:



- iv. After adjustment the A pin should appear as shown below and the white streaks will be gone. This is an iterative process. Use the Printhead Reference Pins located in the machine as a starting point for the adjustment



c. Wavy Paper

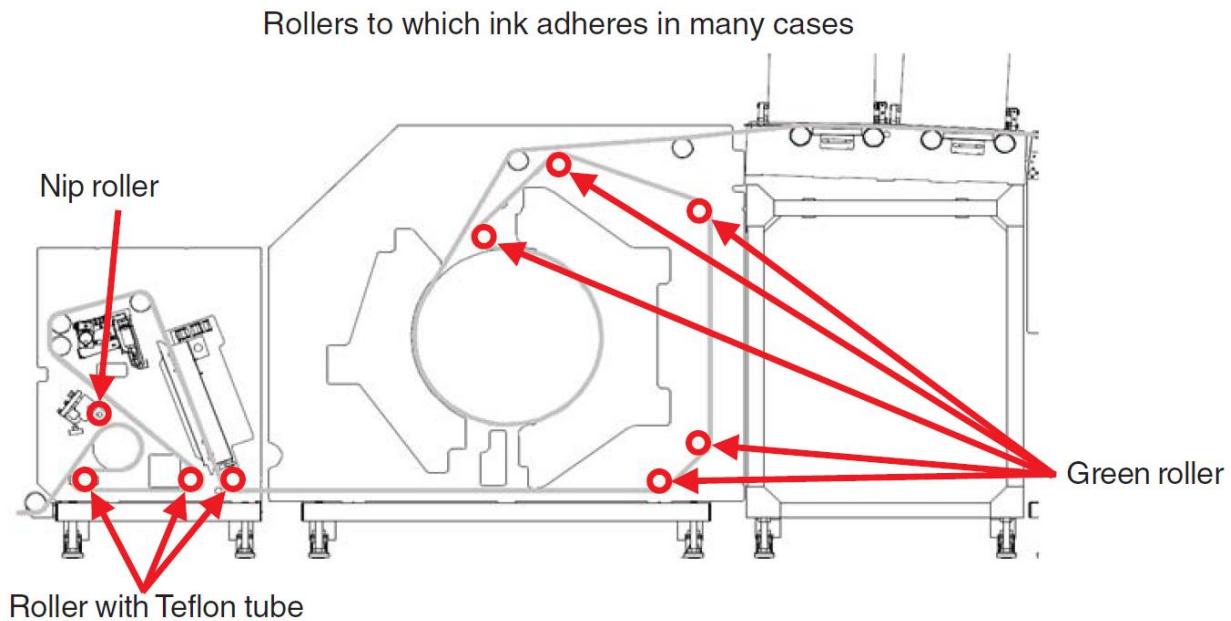
- Refer to **Vertical Color Registration** section of this document to verify there is no waviness in the paper movement
- If it is suspected that the Uniformity was created on wavy paper – roll back to Default and recreate a new Uniformity

d. Paper Tracking Incorrectly

- Refer to **Horizontal Color Registration** section of this document to ensure that paper is tracking correctly through the press
- Visually look at the paper in the Entrance unit to verify the paper is perfectly smooth and flat. If there are any rollers with too much ink build up or damaged bearings the Density will sometimes shift

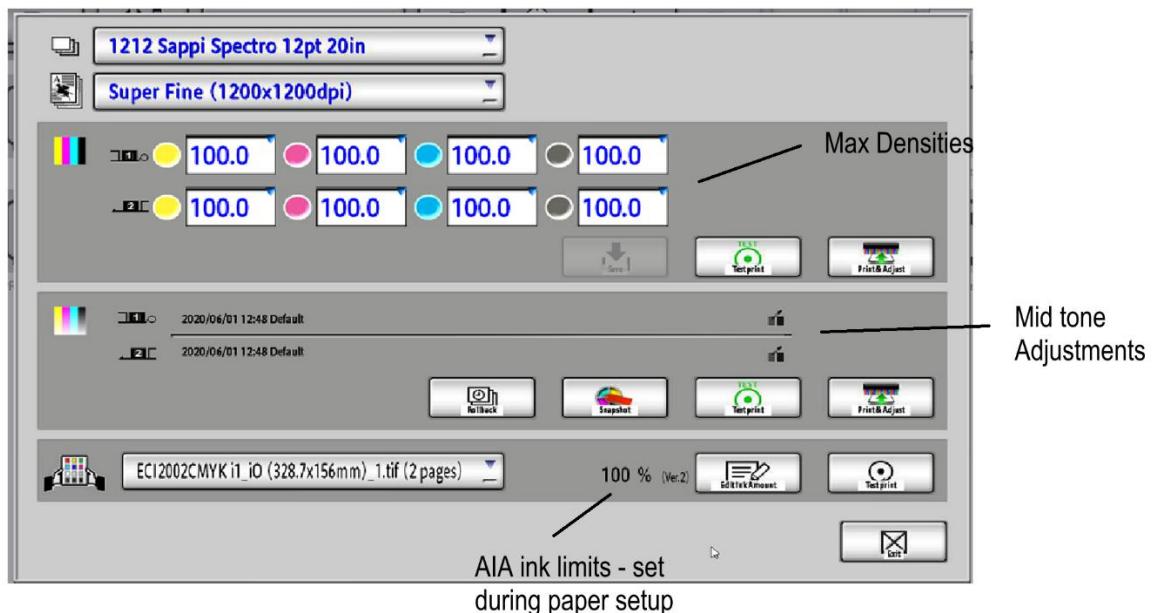
7. Ink Picking or Smearing in the Printer

The rollers shown below will have ink buildup that will be noticeable if ink is picking or smearing on the paper. This section outlines the possible causes



a. Density or AIA is Set too High

- Too much ink on the sheet can cause these issues. Ink Densities are adjusted in the Density Menu on the Gui shown below. Verify settings by contacting Screen Service

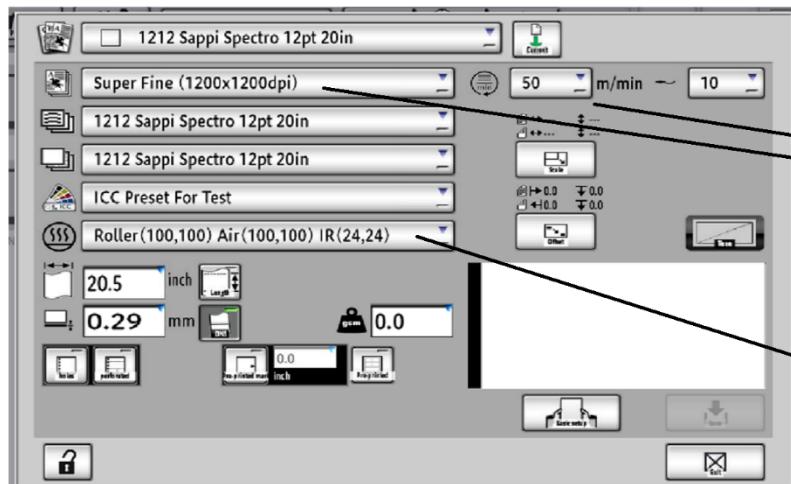


b. Speed is Set Too Fast for Paper Type/ Ink Amount

- i. If Ink Densities cannot be changed, then reducing speed in the Print Condition can prevent picking and streaking

c. Temperature is Not Set High Enough

- i. Increase the Temperature settings in the Print Conditions incrementally until the picking or smearing is not noticeable

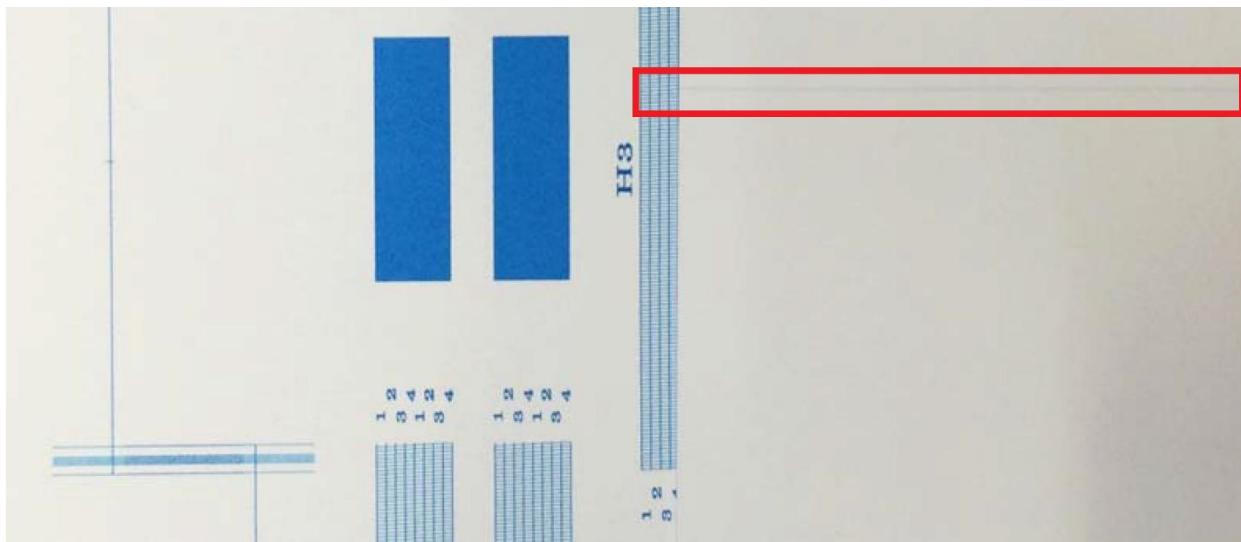


Printer Speed and Resolution
can contribute to Picking &
Smearing

Incorrect Temperature Settings
can contribute to Picking &
Smearing

8. Constant Firing Nozzle(s) or Drooping Nozzles (Delamination)

- a. If constant fires are seen – replace the Printhead as soon as possible



Example Print head nozzle unusual discharge

When head module has problem, streak appears in un-printed area. For example, after finish print and feed paper until stop feeding, streak appears during feeding.

- b. Delamination – If this is affecting the Job then the Printhead needs to be replaced

