

HP Latex 3XX and 5x0 Series Printers



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Telescoping, Media Skew, and Media Advance correction

Scope

This document explains the steps required to reduce the severity of telescoping on the take up reel (TUR) and input spindle, and skew issues relating to uneven media advance. Some telescoping (less than 10mm of media travel) and skew (1mm per meter of printed media) can be considered within specifications, please check the User Guide for more details. However, excessive amounts of skew and telescoping can lead to several issues, including image quality problems, media distortion/jamming, and print head crashes.

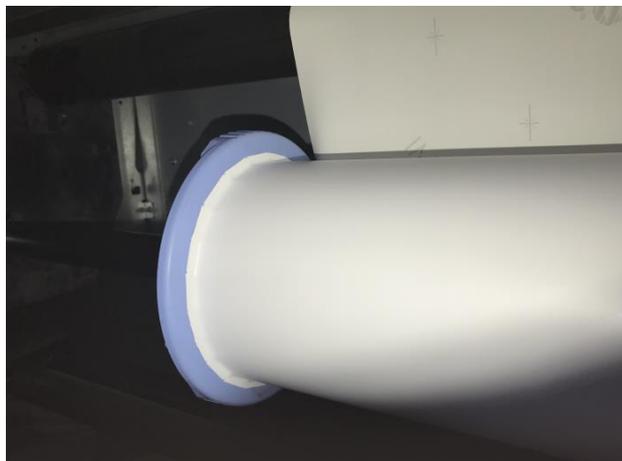
Issue Description

Telescoping

Telescoping can be described as lateral movement or sliding of the media along the media core during winding. This lateral movement causes the media to wind off-center in a progressively misaligned manner, potentially forcing the media into the spindle hubs at either end. Any hub contact can cause rippling or damage to the media edges, and in extreme cases cause printhead crashes due to waves in the print media before the output platen.



Media telescoping on TUR



Media-to-Hub contact

Skew

Media skew can be defined as the abnormal traversing of the media when moving through the print zone, or the media not advancing parallel with the vacuum platen. Excessive media skew can lead to image quality issues and media advancement issues, leading to:

- Telescoping
- Ink smears
- Substrate jam/damage and printhead crashes
- Tiling issues or banner mis-matching (length or width inaccuracies)



Media not moving parallel through print zone

Media Advance

Media advance issues generally present themselves during tiling operations, or wallcoverings where image alignment and color is not accurate over the course of the print job. Media advance can also cause other issues, such as geometry inconsistency (bowing, trapezoid, rhomboid prints) and image quality reduction.

Media Loading, Set up, and Long Run Configuration

The most common cause of telescoping is due to media handling, loading, and configuration, which can be mitigated by the following steps:

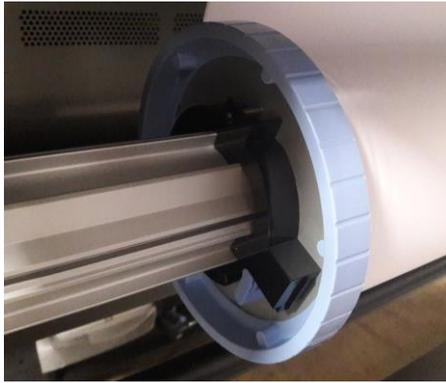
Media Loading

- Keep the media in the same room as the printer for at least 24 hours (for media susceptible to shrinkage). A difference in temperature between media and printer can cause distortion during curing.
- Ensure the media is loaded correctly onto the core with straight edges, and that the media is wound tightly. Cheaper media can often be wound at the incorrect tension, which can leave excess air between the layers. Media can also be wound at different tensions at both ends, which can be identified by a loss of tension at one side of the substrate between the input roll and the drive roller.
- Do not lift the media roll vertically from the center (axis of core facing up), especially with low friction media, as this can cause the media to telescope and lose tension.

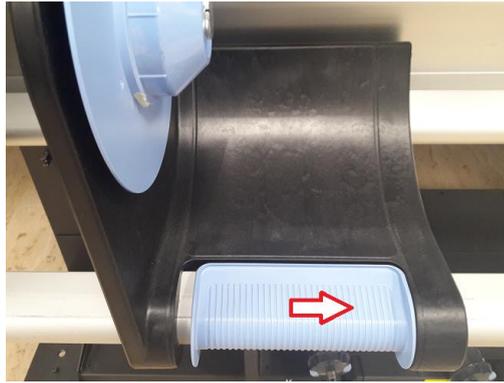


Telescoping from lifting

- Lock spindle hubs/MIMO slider and verify that hubs cannot move after locking.

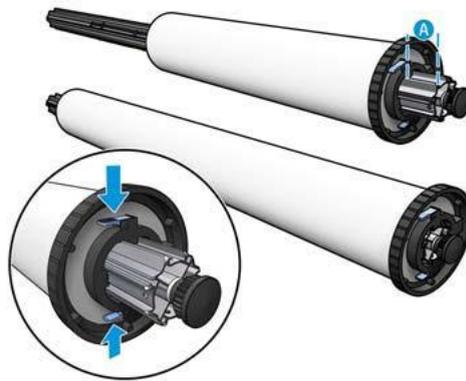


Hubs locked



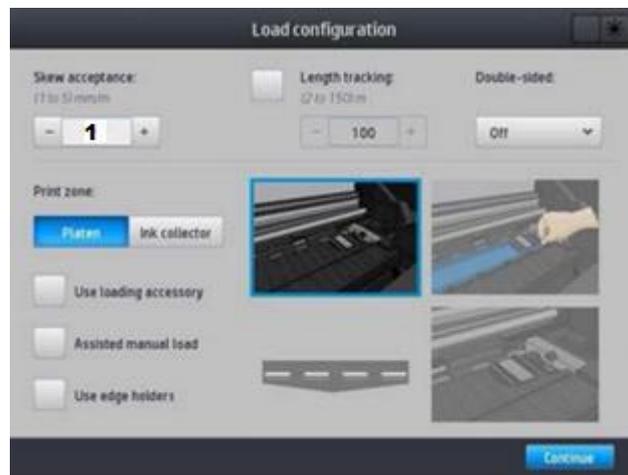
MIMO handle locked

- For the Latex 300 Series only, on the 76mm (3in) spindle use the second position for narrower rolls.



Printer Configuration

- Select the correct profile for the media and reduce the skew acceptance to 1mm.



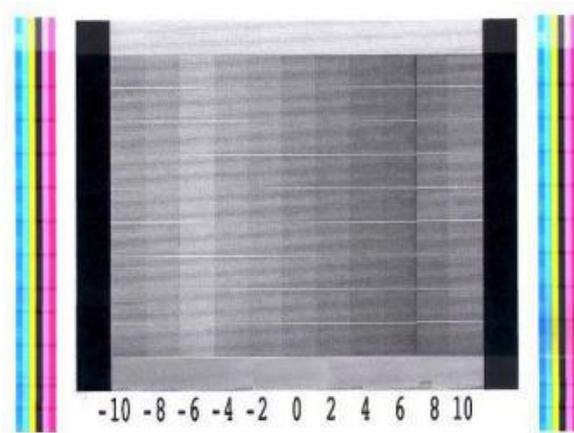
- Load the media as straight as possible into the printer. If necessary, use the media loading accessory for more difficult medias, such as textiles.



Media Loading Accessory

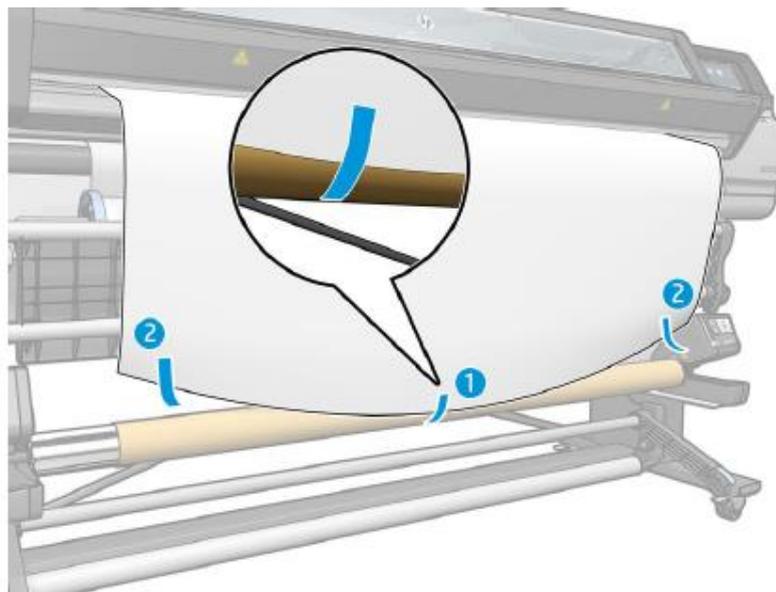
- If the media has any texture or ripple on the backing, Turn OFF the OMAS in the media profile. The OMAS works best with a smooth backing.

- If the media prints to correct length with OMAS set to OFF, then that is a valid media profile setting for many media. Simply run the Substrate Advance and enter the substrate advance value for the media into the media profile and pass mode. In the example below, we would use a setting of '-6'.



- If using the take up reel (TUR), attach media to the TUR before starting to print.
- Secure or tape the media to the empty core as straight as possible, starting in the middle then to each side.

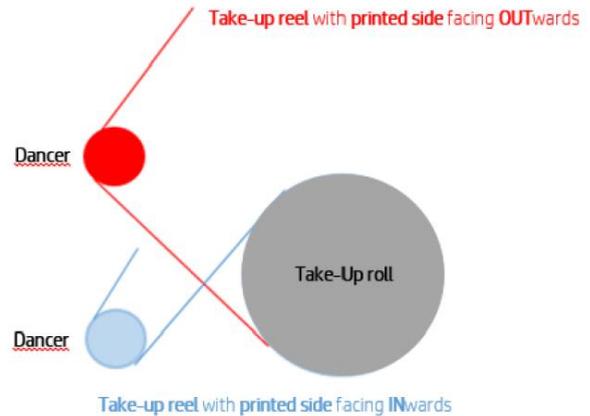
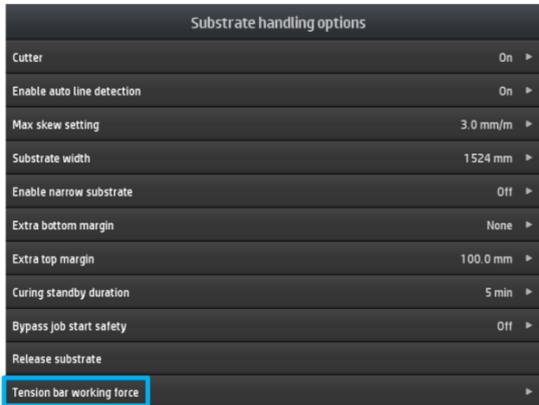
NOTE: Never pull the media when loading the TUR or skew can be introduced.



TUR taping sequence

- Minimize rewinding the media back onto the input roll, as there is a greater tendency for skew when reversing the media. If possible, do not rewind media after TUR attachment.
- Print with the media going to the floor, and run some test prints. If the test prints are good, then the printer is capable of accurately advancing the media.
- If you determine that printing to the floor (No Take-up Reel) provides the best accuracy, but you desire to use the TUR, then choose the lowest tension setting possible.
- Use the counterweight kit (on the Latex 300 series only) to reduce tension on the media if required.

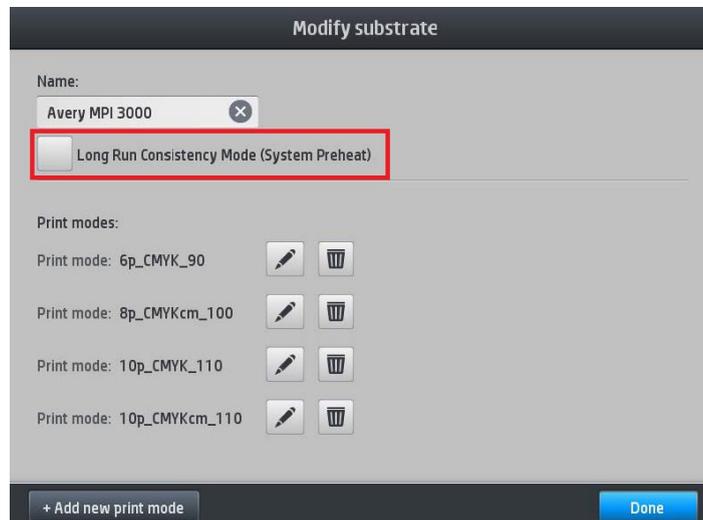
- Tension on the 5XX series can be reduced or increased through the front panel in substrate handling options, or by loading the printed side of the media inwards for less tension and outwards for more tension.
 - Self-Adhesive usually requires less tension
 - Paper usually requires more tension



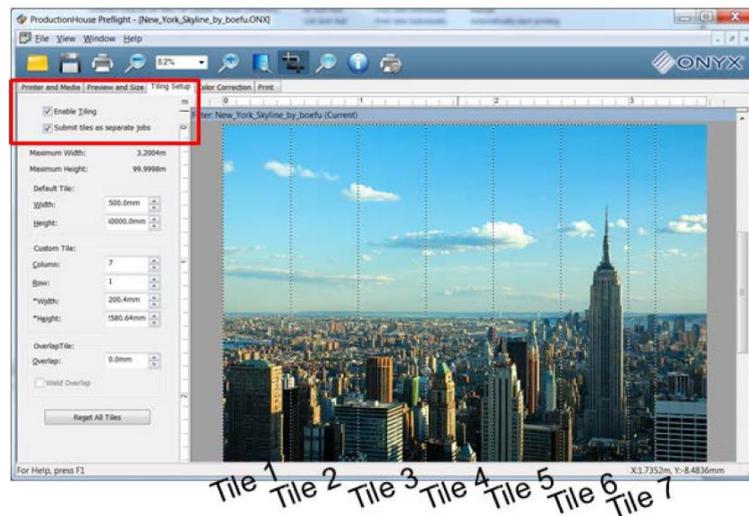
- Perform an advance media calibration chart after loading to TUR (or use the Step alignment chart if OMAS is turned off or not available). Tension on the media changes after loading to the TUR, and can affect the initial calibration.

Long Run Configuration

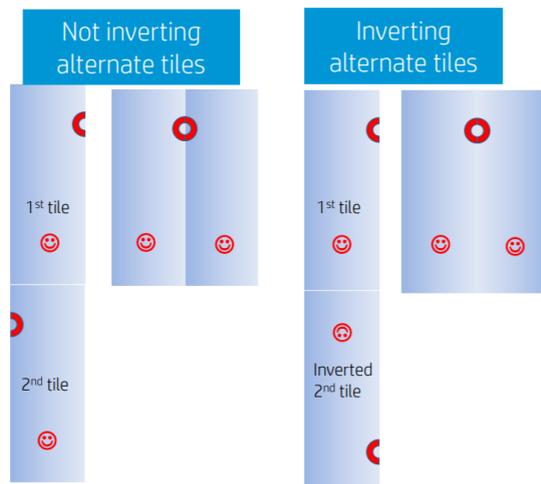
- For wall panels and other long run configurations, select **Long Run Consistency Mode** from the printer front panel. Navigate to **Substrate library > Modify substrate** and check the **Long Run Consistency Mode** box.



- Set up tiling in Rip (if available) to separate the job into two or more images. This is especially required when the image size is very large, or for the page size is for display purposes.



- Rotate or invert every other file, as color shift and geometric inconsistencies will be less visible once the printed tiles are aligned.



- Once printing has started do not change the print adjustment settings and, if possible, do not stop the job until it has been completed. Prints that are performed at different times are more likely to show color and alignment inconsistencies due to environmental changes.
- Some RIPs may provide a scaling option that allows you to compensate easily for top/bottom substrate shrinkage or expansion. If you see consistent print length distortion, you can then use the distortion factor in your RIP's media settings. The RIP can elongate or truncate the prints automatically by a specific percentage to help offset any print length change that may be caused by the printer's drying and curing elements when they heat the wallcovering media.
- If the media is still suffering from shrinkage, reduce the number of passes or reduce the curing temperature to prevent the media from being distorted during printing.

Issue Mitigation

While the issues covered under the scope of this document can happen independently, the corrections that can be used for one may be used to mitigate the other, as the potential root causes are similar. The root causes can be categorized into the follow sub-groups:

- Printer levelling and maintenance
- Media loading, printer set up, and long run configuration
- Hardware and other issues

Printer levelling and maintenance

Correct printer set up and maintenance is essential in ensuring the media advance is straight and does not skew. Some of the more important factors to be considered are:

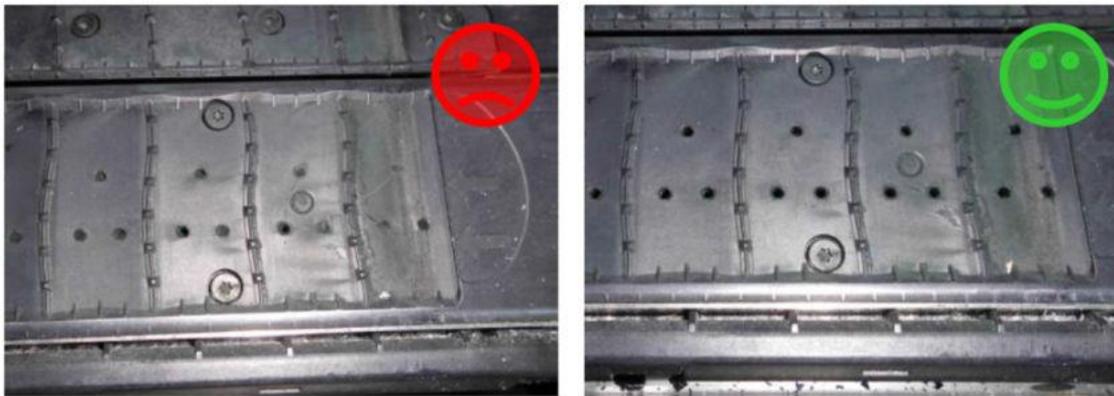
Printer levelling

The printer must be set up on a level surface, as installation on a sloped or uneven surface can create torsion on the printer body, affecting media path straightness. If the printer has been installed for a long period of time on an uneven surface, permanent media path deformation may occur.

Maintenance

Correctly scheduled and performed maintenance is essential to the correct functionality of the printer.

- Verify that the maintenance schedule been kept and the correct maintenance has been performed.
- Check that the firmware is up to date, as the latest versions of the firmware can correct communication errors, or provide new correction options from the front panel or RIP.
- All vacuum holes on the platen should be free of dust, debris, and ink to prevent uneven vacuum across the platen (please refer to the User Guide for the full vacuum cleaning process). Blocked holes can cause the media to move on the platen at different rates depending on the vacuum applied. If the TUR is in use, try to lower the vacuum level



Blocked vacuum holes

- Verify the impinging module air curtain exit holes are clean and that uniform heat is being delivered to the print area. Uneven curing can lead to media distortion through the output platen.



Impinging air curtain exit holes

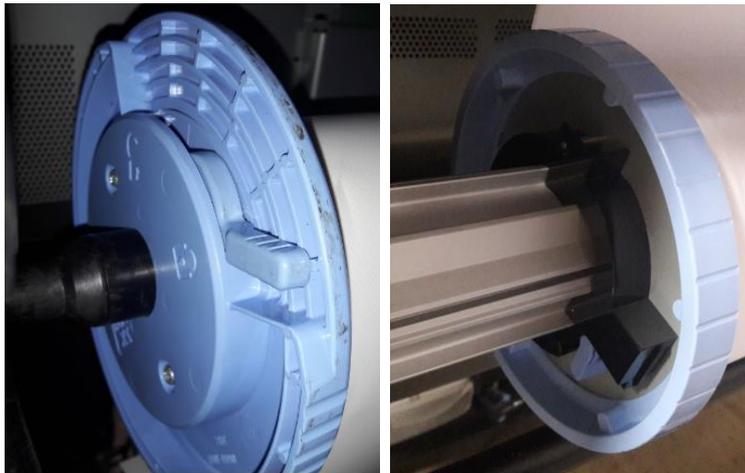
This can be checked by printing the CuringTestDark_103x150.tif file which can be found attached to the service manual. During the printing of this test file, the curing system can also be monitored from the service menu at **Diagnostics tests > Heating and curing > Curing systems monitor**, including fan PWM, temperature, fan speed, voltages, etc., to check for any discrepancies.

- To promote smooth media advancement, the drive roller should be clean and debris-free, and the pinch wheels should be able to move freely. Replace any pinch wheels if they are broken or cannot move freely.



Broken Pinch Wheel

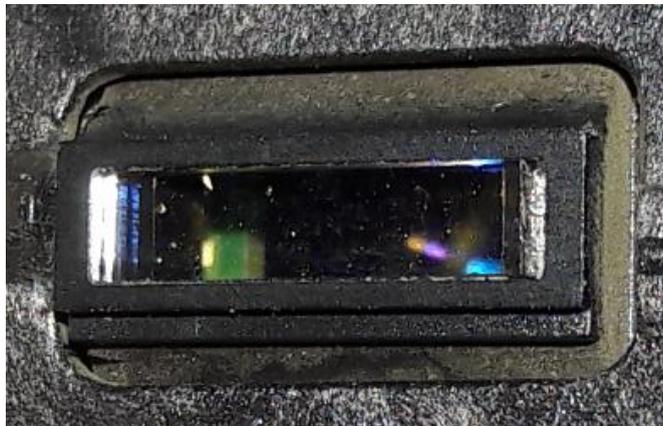
- For the Latex 300 Series, check the distance from the Pinch Roller to the Driver Roller by using small pieces of paper. Using the pinch lever, close the pinch roller clamp with one paper between the drive roller and the pinch roller on the left and on the right sides. Then compare the distance roller-to-roller by pulling the papers on both sides.
- For the Latex 300 Series, check that the spindle hubs are in good condition, that the clamps engage, and that the hubs cannot slide along the spindle.



- For the Latex 500 Series, verify the output hub pinon has an alignment ring (indicated by the arrow) and check the set screw is not loose.



- Ensure the OMAS sensor is kept clean. The OMAS may need to be cleaned thoroughly or replaced if the window is permanently obscured. If the media is suspected to not be read by the OMAS, try disabling the OMAS in the printer's front panel.



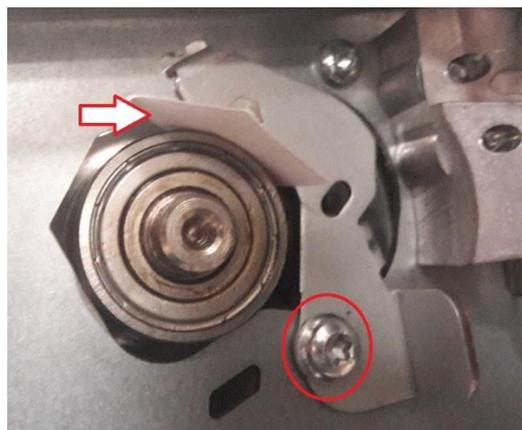
OMAS with particles under glass

Hardware and other considerations

If the above steps have been followed and the printer is still experiencing issues with excessive skew, telescoping, or media advance issues, then the following changes and checks can be implemented to correct or diagnose the issue:

Media Drive

- Perform diagnostic tests on the rewinder system, drive roller, substrate path sensor, and auto pinches under **Diagnostics checks > Substrate path**.
Note: The auto pinches test is not applicable to 3XX series printers.
- Remove right cover and service station and check drive roller brake/bracket. Check to see if there is a gap between the driver roller and the roller brake/bracket. This can be performed by using a slip gauge or sheet of paper (approx. 100g weight). If a gap is identified, loosen the highlighted screw, move the bracket tight to the drive roller, and re-tighten the screw. Perform the drive roller calibration if the position of the bracket was adjusted.



Drive roller gap

MIMO (Latex 500 series)

- Check the TUR functionality by performing TUR and tension bar diagnostics tests, under **Diagnostics checks > Substrate path**.
- Check for loose transmission hubs on MIMO. This can be identified by removing the input/output covers and checking the screws holding the transmission hub axles and common shaft mounts, for both the input and output rolls.



MIMO Common Shaft



MIMO Hub Axle

TUR (Latex 300 Series)

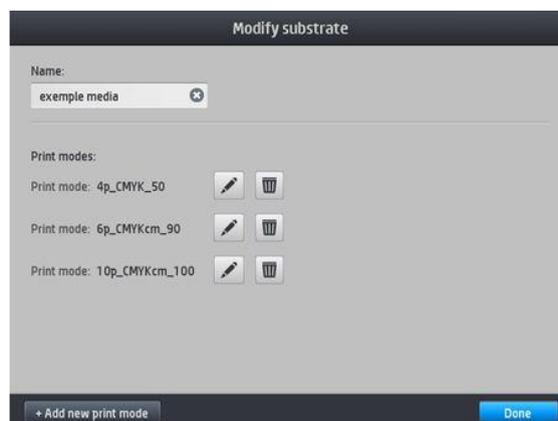
- Check the TUR functionality by performing TUR and tension bar diagnostics tests, under **Diagnostics checks > Substrate path**.
- Check the input/output shaft side mounts (roll modules) for cracks from forcing the spindle.



Printer Settings, Media profile, and tolerances

A default stock profile may or may not yield an exact length accuracy. The measures needed to get an accurate length may vary depending on the location, altitude, and print environment of the printer. However, once those settings are dialed in, the profile can yield better length consistency.

- In the case of media wrinkling in the print zone, input tension can be increased to level out the wrinkling effect (this is most effective on certain vinyl substrates). This can be changed through the **Modify substrate** menu in the printer front panel.



If you cannot find the correct printer settings for your substrate, you can start by copying the printer settings from a similar substrate of the same family and apply some modifications to the main hardware settings:

Setting	Description	If too low	If too high
Passes	The number of passes specifies how many times the printheads will print over the same area of the substrate.	The amount of ink fired per time unit is larger and the ink has less time to dry on the substrate. This may create coalescence and banding. The boundaries between passes may be more visible. However, printing speed is relatively high.	Colors are vivid, print quality is high. However, printing speed is relatively low. A lower curing temperature is needed, otherwise the substrate may become deformed.
Curing temp.	Curing is needed for the latex to coalesce, creating a polymeric film which acts as a protective layer, while at the same time removes the remaining co-solvents from the print. Curing is vital to ensure durability of printed images.	The print may emerge not fully polymerized, so that the ink smears when rubbed. The print may appear wet, after printing or later. You may need to increase the number of passes to achieve adequate curing	The substrate may wrinkle under the curing module, causing defects such as blisters or liner detachment. The substrate wrinkles may also cause vertical banding or ink smears at the beginning of the following plot.
Airflow	Airflow helps to remove the evaporated water from the print zone and thus allows more efficient drying.	In general, use the substrate family default value.	
Substrate advance compensation	Your printer was calibrated at the factory to ensure that it advances the substrate accurately when using supported substrates in normal environmental conditions. However, you may find it useful to adjust the substrate advance when printing in an unusual but stable temperature or humidity level, or if the substrate-advance sensor is not working.	You may see horizontal banding or graininess.	You may see horizontal banding or graininess.
Input tension	Tension is applied to the substrate from the input spindle. It needs to be consistent over the full width of the substrate, thus substrate load is a critical operation.	The substrate skews and may become increasingly wrinkled in the printing zone. Also, substrate advance may be irregular, resulting in horizontal banding.	The substrate may be permanently deformed or damaged. Substrate-advance problems may appear in extreme cases.
Vacuum	The vacuum applied to the substrate at the printing zone helps to hold the substrate down on the print platen, keeping the distance to the printheads consistent.	The substrate may lift up off the platen and touch the printheads. This can smear the printed image, cause vertical banding, cause a substrate jam or even damage the	For sticky substrates, friction could be too high and the substrate advance irregular, resulting in horizontal banding or irregular grainy patches.
High ink level	The maximum quantity of ink will be laid on the substrate (the High-ink level option is only available when the number of passes is 10 or more). The ink quantity may be reduced by the RIP color profile.	If not selected, colors may look washed-out.	If selected, there can be an excess of ink and some problems related to poor drying and curing. TIP: Select High-ink level for backlit and some textile applications, or if you want high color saturation.
Auto tracking (OMAS)	The substrate-advance sensor (also known as the Optical Media Advance Sensor, OMAS) is located under the print platen; it can track the substrate advance automatically.	Disable the sensor in the following cases: <ul style="list-style-type: none"> • When the substrate allows ink to pass through to the platen. Clean the sensor after using the substrate. • When you are instructed to do so by the front panel because the sensor is dirty or unable to track the particular 	