

Ink Feedback to the Dampener System



Sappi Printer Technical Service

877 SappiHelp (727 7443)

Problem

During the press run, ink uncontrollably feeds back and builds up on the dampener rolls negatively affecting ink/water balance, ink transfer, and print integrity. This condition may necessitate the need for frequent blanket/roller washes which further results in high paper waste and inconsistent print quality.

Description

Ink feedback and excessive build-up on the dampener rolls is a common nuance of high-speed web offset. This condition has become more of a challenge since the switch to alcohol-free fountain solutions in conjunction with continuous-roll dampening systems that directly apply solution to the plate without any connection to the ink rolls. The dampener form roller picks up ink from the plate and transfers back to the metering roll via porous and ink sensitive chrome rolls within the metering system. With no path back to the inker, the emulsified ink can only continue to build-up until it further interferes with any potential for precise ink/water balance. Chemistry, press configuration, and ink coverage are the primary contributing factors in the negative interaction that results in excessive ink feedback.

Light ink coverage and take-off in conjunction with an alcohol-free, non-integrated continuous dampening system can be the worst-case scenario resulting in unmanageable ink feedback. This condition can be further aggravated if heavy ink film density is being pushed to achieve desired color. In this situation, the three primary opportunities to overcome the adversity of ink feedback are reducing the potential for ink over-emulsification, maintaining a dampening system that is not ink-sensitive, and, if possible, bridging the inker/dampener to allow the ink a path back to the ink rolls.

Causes

- Sensitive chrome and/or metering rolls.
- Chrome rolls are etched or otherwise too porous.
- Light ink coverage; lack of ink take-off and fresh ink replacement.
- Inker and dampener are non-integrated.
- Incorrect roller durometer.
- Incorrect dynamic ink temperature; inker chill preset.
- Incorrect fountain solution temperature.
- Contaminated fountain solution.
- Contaminated ink rolls interfering with proper ink transfer.

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- Inadequate water treatment system.
- Fountain solution mix is too aggressive.
- Incompatible ink and fountain solution.

Options and Solutions

PRESS CONSIDERATIONS

- Desensitize and gum chrome rolls and allow dry time before start-up. Although expensive, ceramic rolls are harder and less porous than chrome so they are easier to keep desensitized with fewer tendencies to carry ink. This roller conversion has been known to significantly reduce levels of ink feedback.
- Clean the rubber metering rolls with metering roll cleaner (MRC), and follow-up with a desensitizing gum solution. Allow dry time before start-up.
- Clean and deoxidize ink rollers to remove the cumulative build-up of paper, detergent, and chemical contaminants. This consideration should be part of a weekly maintenance plan.
- If options permit, engage the bridging roll or otherwise integrate the dampener and inker to divert potential ink feedback in the dampener back to the ink rolls.
- When running alcohol-free, nip points and roller durometer within the dampening system are much more critical. The metering roll in particular requires a lower durometer shore, (18–22) and the nip point between the chrome and metering roll should be reduced to 3–5 mm (1/8–3/16").
- Optimize water control across the plate by adjusting the metering roll skew. Increase skew angle if the form roll is delivering too much water to the center of the plate. Conversely, move the skew closer to parallel to dry the ends and/or increase water feed to the center of the plate.
- Water control outside the web width can be better controlled by adding screened mourning bands to the plates outside the web width area. In addition, cut blanket packing to actual web width to avoid the unnecessary transfer and build-up of ink and fountain solution that can't be carried away by the web.
- Keep inker at ideal operating temperature by optimizing the zone control pre-set to the oscillating ink rolls and fountain balls. Ideal operating temperature of the inker for proper ink feed and transfer is typically 75–85° F. (24–29° C.). The zone control preset provides temperature consistency for both cold startups and continuous runs. Consult with ink supplier.

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- Alcohol-free fountain solutions do not need to run as cold as alcohol solutions. Avoid running alcohol-free dampening solutions either too cold or too warm. Recommended temperature at the metering pan during operation ranges from 65–70° F. (15.5–21° C.). Temperature control preset will depend upon ambient operating conditions. Consult with fountain solution supplier.
- Try engaging the oscillating ink form rolls if so equipped.

CHEMISTRY, INK, AND PAPER CONSIDERATIONS

- Beware that alcohol substitutes and water miscible blanket washes, high in surfactants, can adversely ink-sensitize the metering and chrome rollers and adversely contribute to ink over-emulsification. Solution compatibility within the system is very critical in this regard. Automatic blanket washers should be properly cycled so that it is not possible for the contaminated wash-up solution to transfer back through the fountain solution circulating system. Consult with suppliers.
- Mixing alcohol and alcohol substitutes can result in ink over-emulsification.
- Water treatment systems specifically designed for the lithographic print process supply process water which is stable, consistent, and compatible with fountain solution concentrates. Some treatment systems, such as deionization, produce water which may be too pure and aggressive. DI water is corrosive, and without corrective inhibitors within the fountain solution, may adversely contribute to ink over-emulsification. Consult with suppliers to assure compatibility of fountain solution and water supply.
- Ink water pick-up is especially critical when running light ink coverage with minimal ink take-off. Consult with ink supplier.
- Proper ink film thickness in conjunction with ink/paper interaction is a particularly critical dynamic when running light ink coverage with low ink displacement. Ink strength, tack, and body should be optimized to allow for consistent ink feed and transfer to compliment the paper's ability to absorb, trap, and adequately carry away the ink. Maintaining the recommended ink film thickness allows for moderate water feed to the plate and less tendency for ink over-emulsification.
- Less aggressive etches or higher pH fountain solutions (4.0–5.0) can minimize ink over-emulsification and the potential breakdown of paper and paper coatings which can contribute to blanket build-up and/or calcium carbonate contamination (See Sappi tech tip on Calcium Carbonate).

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- The use of ink take-off bars on the plates can be very beneficial in expediting fresh ink replacement to the inker, but a thin, continuous bar across the plate can also contribute to increased ink feedback across the dampener without offering any significant take-off. If there is only enough space for a thin colorbar, try breaking up the continuous take-off bar by limiting the extra ink take-off to follow only the actual image areas around the plate.
- A compatible relationship between press, ink, fountain solution, and paper is essential. If ink feedback continues to be unmanageable with all due consideration, tests such as pH drift, water pick-up, emulsification curves, Lodcells, and conductivity extremes should be performed to determine if any incompatibilities exist within the printing system.