

# Sheetfed Ink Setoff



Sappi Printer Technical Service

877 SappiHelp (727 7443)

## Problem

The wet ink film sticks and/or transfers to the adjacent sheet in the load before or during the ink set and dry process.

## Description

Other terms referring to wet-ink setoff are offset, bricking, and blocking. Light ink setoff or offset usually describes the micro-transfer of wet ink pigment to the backside of the adjacent sheet in the load, whereas bricking or blocking typically refers to a lift of sheets that have been stuck together by a wet ink/overcoat film under high pressure. In either case, the cause is usually related to a combination of wet ink or overcoat, lack of sheet separation, and pressure.

## Causes

- Ink set and dry time is too slow. Conditions that may compromise ink set and dry include:
  - Incompatible set rate of ink and paper; ink set time is too slow.
  - High relative humidity in the pressroom (over 60%).
  - Improperly conditioned paper (i.e., cold paper in a heated pressroom)
  - Paper absorbing excessive moisture transferred from the plates.
  - Over-emulsified ink from excess water or high-acid fountain solution.
  - High acidity of fountain solution compromising ink drier.
  - High conductivity of fountain solution compromising effective ink set.
  - Too much or too little drier in the ink.
- Ink/varnish film is running too heavy for the intended formulation and color.
- Static electricity causing sheet cling in the delivery and finished load.
- Excessive I.R. or ambient heat.
- Side joggers and/or back joggers are set too tight causing pile disturbance in the delivery.
- Printed loads are piled too high.
- Insufficient anti-offset spray powder and/or micron size of spray powder is too small for substrate basis weight and ink coverage.
- Electrostatic spray tubes are dim or coated with burned-on spray powder.

## Sheetfed Ink Setoff (continued)



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- Distribution roll in electrostatic spray powder box is coated with burned-on spray powder.
- Electrostatic air curtain is plugged, misaligned, or set at the wrong PSI.
- Pneumatic and electrostatic powder dispersion is compromised by moisture contamination or compaction.
- Rough handling of wet printed loads.
- Delivery fan speed is set too high causing sheet-slap and/or excessive air turbulence compromising spray powder dispersion.
- Excessive sheet curl or wedged corners due to heavy ink coverage.
- Excessive I.R. heat is re-softening first side coating or varnish during back-up printing.
- Printed loads were prematurely off-loaded or left unchecked too long without winding.
- Printed loads were banded prematurely or banded with too much pile compression.

### Options and Solutions

- Ink set rate should be compatible with absorbency of the substrate surface. A tighter-surfaced, high-holdout substrate may require a quick-set ink, whereas, a more absorbent soft-surfaced substrate may demand a less interactive and slower ink set.
- Balanced ink/water control, optimum ink film thickness, and proper ink density are all key considerations in maintaining ink integrity for proper transfer, set, and dry. Avoid carrying too much ink or water. Emulsified ink loses drier effectiveness and easily offsets or never completely dries. For timely and thorough ink dry consider the following best-practices:
  - Select the ink formulation best suited for the job and substrate. Do not alter inks without consulting with ink supplier.
  - Ideal pressroom environment is 45% (+/-5%) Rh @ 72° F. for North America and 52% (+/-5%) Rh @ 21° C. for Europe (See Sappi tech tip on Paper Conditioning & Characteristics).
  - Allow paper to fully acclimate to recommended pressroom environment before unwrapping. Paper acclimation is relative to volume of paper and environmental extremes, but the industry-accepted best-practice is 24–48 hours.

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- Optimize ink/water balance and minimize water to the plate whenever possible.
  - Fountain solution should be buffered to a pH no lower than 4.0 (European printing systems tend to run more alkaline recommending a pH value no lower than 4.8).
  - Consult with fountain solution supplier for appropriate conductivity of fresh solution.
  - “Wind” printed loads in small lifts after ink has sufficiently set.
- Ink formulation may need to be strengthened to achieve desired color without running too heavy. A thinner ink film will also allow for less water to the plate.
  - Static electricity may create problems when relative humidity falls below 35%. Installation of an on-press static eliminator may be necessary.
  - Load temps can actually increase as the ink film chemically oxidizes. Maintain load temperatures at or below 95° F. Avoid storing or staging printed product in areas with sources of high heat.
  - Check that side and back joggers are properly adjusted to gently jog the pile with minimal disturbance.
  - Rack loads in short lifts commensurate with ink coverage, substrate weight, and substrate absorbency.
  - Heavy cover stocks may demand a larger micron spray powder. Consult with supplier.
  - Powder dispersion and uniformity can be checked with a special light illuminating across and parallel to the sheet surface. Increasing spray powder on the back-up or final pass is a worthy consideration for preventing offset, but excessive amounts can adhere to wet ink or varnish causing an undesirable rough texture conducive to abrasive scratching in finishing or shipping.
  - Electrostatic spray unit light tubes should be cleaned regularly as they become loaded with burned powder. Tube can be removed and cleaned with 3M pad or steel wool. Dim tubes should be replaced.
  - Distribution roll in powder box can also become inefficient with burned-on spray powder. Roll should be cleaned regularly with chlorothene or other supplier recommended cleaning solution.
  - Check electrostatic air curtain for proper flow, direction, and air pressure as per supplier recommendation.
  - Powder supplies and reservoirs should be kept dry and contents loose for proper dispersion. Air lines should be equipped with in-line moisture traps to filter condensation.

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- Avoid jerking or rough handling of wet loads (i.e., bumps or cracks in floor often cause offset).
- Minimize delivery fan speed so sheets float rather than slap when jogged in delivery. Reduce fan or air exhaust turbulence to maintain even spray powder dispersion across the sheet.
- Keep printed lifts as flat as possible during sheet delivery. This may require the use of an on-press sheet decurler.
- Avoid excessive IR heat and pile temp build-up on back-up, especially when aqueous coating.
- Continually check drying loads once off press and insure ink is completely dry before off-loading for bindery or finishing. If offset starts to appear, carefully wind loads from diagonal corners in very short lifts.
- Use caution when banding loads for shipping. Ink that feels dry-to-the-touch often is not thoroughly polymerized. Pressure and absence of oxygen can easily cause offset and blocking. Side containment by cello-wrap is a good alternative to compression banding when transporting rush jobs for out-source finishing.