

Sheetfed Blanket Release Shearing Stress



Sappi Printer Technical Service

877 SappiHelp (727 7443)

Problem

The printed product exhibits paper distortion, misregister, gripper slip, dot slur/doubling, curl/tail-hook, or tail-pick/piling; all problems that may be caused by the negative effects of high-force blanket release.

Description

Although other print system components may be contributing to these defects, this tech tip focuses on the role of the blanket and its release properties. Certain chemical and surface characteristics of the blanket in combination with hard, smooth-coated paper surfaces can negatively affect how an ink film splits from the blanket onto the paper. If splitting forces are too high and the paper does not readily release from the blanket, the prolonged effect of the paper lifting off the impression cylinder and following the blanket after the impression nip can produce undesirable shearing stress. The negative effects of blanket release shearing stress include:

- **Sheet Distortion or Reverse-image Embossing** – Paper smoothness and stiffness in conjunction with layout and force of blanket release can cause the printed image to pucker or emboss.
- **Gripper Slip** – The pre-release of the sheet from the grippers during the process of high-force blanket release. Slur and misregister from gripper slip can be determined by studying the migration of the slur. Gripper slip will produce an around-the-cylinder slur from the gripper edge of the imagery back to the tail. If the sheet slips more on one edge than the other, the slur will move from a circumferential direction on the gripper edge to a more angular slur on the tail. Usually, the slip occurs where the heaviest ink coverage causes the highest force of blanket release.
- **Sheet Curl or Tail-hook** – Shearing stress sheet distortion from high-force blanket release usually occurs with heavy ink coverage at the tail edge of the sheet. High tack forces in conjunction with sheet tension causes the paper to hook or curl away from the printed side at the tail edge. When comparing with equal ink coverage, the force of tail-edge blanket release is always higher than the force of lead-edge release.
- **Tail-pick or “Snap-outs”** – Occurs at the trailing edge of the image or color-bar, where release forces are highest. This condition results in ink piling which progressively increases in tack eventually picking the paper and blanket surface.

Misregister / Dot Slur – High-force blanket release causing paper stretch can result in unit-to-unit and lead-to-tail misregister or dot slur from tail-edge sheet flair and/or sheet distortion.

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Shearing Stress (continued)



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Coating / Fiber Pick – High-force blanket release in conjunction with high ink tack build can challenge the paper surface to the point where the coating fails and picks on press.

Individual Sappi tech tips on the above topics discuss other causal factors but the most significant commonality is high-force blanket release. For a video demonstration on the effects of shearing stress during blanket release go to:

<http://www.youtube.com/watch?v=CGIY-VqNX3w>

Blanket design characteristics that have a direct effect on release include:

- **Tensile Strength** – With limited and uniform stretch designed into the fabric carcass, this is the blankets ability to resist breaking down under the forces of torque, impression squeeze, and rebound.
- **Surface Roughness** – Generally, a rougher-finished blanket will have better release properties, and a smoother-finished blanket will have better dot reproduction. When considering print quality and release, a smoother-surfaced paper can benefit from a rougher-surfaced blanket and vice-versa.
- **Compressibility & Resiliency** – The blankets ability to quickly compress and rebound to original height in equal amounts over the entirety of its surface.
- **Chemical Make-up** – The make-up of the blanket's surface must offer chemical compatibility to resist swelling and deterioration from excessive solvent/ink/varnish absorption while uniformly receiving and transferring the ink/fountain solution film to provide excellent print quality and lubricity for release.

Work with your blanket supplier to carefully choose the right blanket to compliment the diversity of papers typically run in your pressroom.

Causes

- Cold start-up.
- Ink tack too high at point of blanket release or sets too fast through the press.
- Prolonged make-ready or extended downtime causing tacky rolls and blankets.
- Excessive back-cylinder squeeze.
- Fountain solution lacks lubricity or is running too dry.
- Layouts with disproportionate or checkerboard ink coverage; heavy tail-edge solids.
- Blankets are over-packed or have lost their compressibility and rebound capabilities.

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- Chemical incompatibility has created swollen or excessively tacky blankets.
- Blanket finish is too smooth for equally smooth-surfaced paper causing high-force release due to the high contact area of blanket to paper.
- Set rate of the paper incompatible with the set rate (speed) of the ink. Tack builds too quickly through subsequent units of print causing high-force downstream blanket release.

Options and Solutions

- Dynamic ink temperature affects ink tack and transfer. Most ink suppliers recommend dynamic ink temps of 75-83° F. (24-28° C.) as measured and averaged by a hand-held non-contact IR thermometer from various points across the ink train away from chilled oscillators. Consult with ink supplier and maintain chill temps accordingly. Fountain solution should also be chilled to maintain a pan temp of 65-68° F. (18-20° C.).
- Try a lower tack ink or an ink that sets and builds tack more slowly.
- Keep ink rolls lubricated with tack reducer during prolonged make-readies or extended downtime.
- Reduce impression squeeze to a minimum; especially critical on smooth-coated papers.
- Fountain solution must contain adequate additives such as glycol in the alcohol substitute to provide lubrication, reducing the force of blanket release in both image and non-image areas.
- Certain layouts with checkerboard or disproportionate ink coverage may demand lower tack inks. Layouts should be planned to print heavy solids as close to the lead edge as possible.
- Uniformly dress the press with a matching set of blankets and pack to proper height specification using an appropriate packing gauge.
- Insure the chemical compatibility of blankets with ink and blanket wash.
- Choose a blanket with quicker mechanical and chemical release characteristics. For example, a smoother-surfaced blanket may produce more shearing stress on blanket release due to the higher contact area between the blanket and a characteristically smooth-surfaced coated paper. Also consider the blanket's ability to provide adequate release lubricity by effective transfer and carry of the fountain solution film.