Tech Talk From Prisco®

Tech Talk #11

IMAGE AREA PROBLEMS:
Plate Blinding, Piling and Wear Issues

In a previous **Tech Talk**, we briefly mentioned image area piling, a condition in which excess ink builds up on the image areas of the blanket, causing a gradual deterioration in print quality. Fine lines and highlight dots disappear, and light areas began to show up at the edge of solids.

Although less common, piling can also occur on the plate image area. Along with blinding and premature wear, this condition adversely affects the ability of the plate to accept ink, from the form rollers and then deposit it on the blanket. Again, print quality suffers. Waste goes up, and productivity and profitability go down.

In this **Tech Talk**, we will discuss these problems, analyze their causes, and share with you solutions we have developed through many years of experience working with printers.

Piling Problems

Ink piling on the blanket occurs when too little ink transfers from the blanket to the substrate as it passes through the printing nip. The excess ink remains behind on the blanket and accumulates as a gradually thickening layer.

In much the same manner, ink can also build up on the plate image area over time because of incomplete transfer to the blankets. This condition is known as **plate piling**.

What Causes Plate Piling?

Fountain Solution

Because it is actually an emulsion of fountain solution and ink that is transferred from plate to blanket to substrate, water quality, proper selection of fountain concentrate, dosage (percentage) and compatibility between fountain solution and ink are all very important. Let us help you choose the right **Prisco** formula for your specific operating conditions.

pH

Low pH (generally below 3.5) from fountain concentrate improperly matched to the water or from use of highly acidic fountain additives can cause the ink to become “tacky” or high in viscosity. This can lead to piling. Fortunately, **Prisco** fountain solution formulas are available in a wide range of buffering to suit any water quality.

PRINTERS' SERVICE 26 Blanchard Street • Newark, NJ 07105 • www.prisco.com • (973) 589-7800 • (973) 589-3225 Fax

Water Quality

Sometimes, a shift in incoming water quality (from winter to summer, for example) causes pH of the mixed fountain solution to shift out of the optimum range, and piling results. Consistent incoming water quality is one key to good printing. If you suspect your water varies considerably over time, then consider installing a **PriscoTech AquaFlo® II** water management system.

Correct Dosage

Be sure that you are mixing the correct concentrate at the proper dosage, as specified by your **PRINTERS' SERVICE** technical representative. Be sure to drain the reservoirs and refill with freshly mixed solution on a regular basis. This will prevent problems caused by spent or "tired" solution. You may want to review the tips in our **Tech Talk #8** on **Reservoir Maintenance**.

Other Factors

There are a number of other important variables that affect the ability of the plate and blanket to deliver a clean, sharp image. They include:

Blankets

All blanket surfaces vary in a property called "release", which affects the rate at which ink accumulates in the image areas. Changing from a cast to a ground (buffed) surface blanket, for instance, will provide greater release.

Underpacking any blanket increases its tendency to pile. Increasing squeeze by .025 to .050 millimeters will usually correct this situation. Also, be sure there are no low spots in the blanket surface from unnoticed "smash" areas.

Piling that, despite these considerations, builds up on the blanket is eventually bound to transfer to the plate as it accumulates.

Ink

Inks vary in a property called "lubricity", which affects how well they release from the blanket surface for transfer to the substrate. An ink with inadequate lubricity will stick to the blanket and cause piling.

Other ink factors that may contribute to piling include:

- Poor grind;
- Excess use of heavy inorganic pigments;
- High tack and/or viscosity;
- Emulsification.

If ink is poorly ground or contains too many heavy inorganic pigments, some of these particles may tend to accumulate on the blanket surface as piling. An ink with high tack and high viscosity will be too thick to move off the blanket. An ink that is too highly emulsified contains too much water and becomes puffy or thick. In all of these cases, the ink cannot transfer properly to the substrate. The excess remains behind, and accumulates as piling on the blanket or the plate. Check with your ink supplier to see if any of these properties may be a factor in your on-press performance.

Heat

Heat sources include ambient air temperature (comparing the effects of summer to winter, for example), inadequate cooling of the ink vibrator rollers (on presses so equipped) and heat build-up within the press itself (the drive side may be hotter than the operator side).

Excess heat will cause the ink to lose solvent more rapidly than desired, causing it to pile prematurely. Check with your printing ink supplier. He may be able to reformulate for slightly greater stability.

Too much heat generally means that the non-image areas of the plate and blankets will begin to dry up through increased evaporation. A pressman's natural reaction is to slightly increase water metering speeds to compensate. This can lead to other problems such as ink emulsification. Check with your **PRINTERS' SERVICE** sales representative or technical representative. They may be able to suggest an alternate fountain concentrate that will take care of these problems—without requiring increased water speeds.

Paper

Sometimes fibers come loose from the paper surface and become mixed with ink in the image areas, increasing the rate of piling. This condition is called "picking" and can be due to ink with high tack and/or poor tack stability, or paper with loose surface fibers, inadequate water resistance or poor coating quality. A paper change may be the last resort to solve this problem.

Plate Blinding

Plate image area blinding occurs when the image is present on the plate, but will no longer accept ink. This usually occurs when the image becomes covered with a substance that makes it become hydrophilic or "water loving". Because the image area does not accept ink, print quality deteriorates.

Substances that cause plate blinding include:

- Silicone;
- Surfactant residues;
- Gum;
- Calcium.

Silicone-based defoamers are used in many fountain concentrates because they are effective at low additive levels. When concentrate dosage is within the manufacturer's recommended range, the amount present is typically too small to create problems. Sometimes, in an attempt to combat foam (see **Foaming**, our **Tech Talk #7**), printers use separate de-foaming additives. If too much of this additive is used, the excess will be attracted to the plate image and deposit on it, rendering it water-loving.

All water-miscible blanket and roller washes contain surfactants that enable the solvent to emulsify or form a stable mixture with water for the cleaning procedure. If these washes are used "as is" (without water), the solvent portion evaporates and surfactant may remain behind. This surfactant residue can migrate onto the plate surface, where it may be adsorbed by the image area. Unless thoroughly rinsed with water, the image will go blind and not accept ink.

Gum blinding occurs when there is more gum present in the fountain solution than is needed by the plate non-image area. The excess often deposits on the plate image, making it receptive to water rather than ink. Causes include high fountain solution dosage, unnecessary or excessive use of separate gum arabic solution in the reservoirs, water-logged ink (because excess fountain solution in the ink deposits gum on the image) and use of very old plates that were gummed prior to storage (these plates may show "gum streaks").

If excess free calcium is present in the printing process, it can deposit on the plate image area as calcium carbonate or, occasionally, calcium citrate, and cause plate blinding. These deposits may be invisible to the eye and may be accompanied by formation of a white haze on printing rollers and/or formation of hard white deposits at the roller ends.

This calcium may come from the calcium carbonate in alkaline printing paper, from excessively hard and/or alkaline water used to prepare the mixed solution, and even from some printing inks (chiefly reds and some blues). We have several **Tech Talks** which deal with calcium issues in more detail, including **Calcium and its Effect on Printing** (#1), **Higher pH and the Calcium Dilemma** (#3) and **The Advantages of Process Water** (#6).

For all these blinding issues, once the problem-causing components have contaminated the dampening system, the only way to eliminate the blinding is to mix and use new fountain solution.

Premature Plate Wear

Poor plate life results whenever a plate image wears out prior to the time specified by the plate manufacturer. The plate image area is actually a polymeric chemical coating on the surface of the plate. Although hardened by exposure to light and heat (also called “baking”), it is still subject to abrasion or mechanical wear from several sources.

Poorly ground or inadequately dispersed inks, as well as ink that contains abrasive pigments such as titanium dioxide and some extenders, are all potential sources of premature image wear. Metallic inks may be particularly bad offenders. In these cases, the plate image area simply gets “ground off” and disappears.

Hard and/or improperly set ink form rollers will wear the image area prematurely, because they exert more rubbing forces on the image than it is designed to take. Excessive pressure or “squeeze” between the plate and blanket can have the same effect.

Even the choice of the wrong fountain concentrate, particularly one that results in a mixed pH below 3.5, as well as an incorrect dosage can result in a poor quality ink/water emulsion. If this emulsion is very thick and tacky or gummy, this paste-like material will cause premature image wear.

When these wear problems occur, the printer must replace the plate in order to restore good print quality.

Optimize Your Performance

Our goal is to help you optimize your printing performance. We hope that this discussion of plate piling, blinding and premature wear problems has been helpful to you. The offset printing process is, by its nature, a complex one with many variables. Your **PRINTERS’ SERVICE** sales representative and technical representative are trained to help you sort through these variables. Please contact them for assistance.

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As always, your local PRINTERS’ SERVICE office is happy to answer your questions:

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