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White Paper

Contact Name

Julie Mattison
WW Product Manager, Plates, Kodak
Julie.mattison@kodak.com

“Why would I want to use my expensive press as a plate processor?”

The promise of process free technology is older than digital platemaking. Its advantages are many: removing plate processors eliminates costly, time-consuming steps in platemaking, removes a major source of variation that could affect quality, and reduces environmental impact.

For years, however, printers have expressed concern about the potential for downtime if presses were used to clean out the non-image areas of a printing plate. Concerned about contamination of the fountain solution or possibly material buildup on the rollers, they have asked “Why would I want to use my expensive press as a processor?”

This paper discusses the history of process free plate technology and shows how Kodak’s Press Ready Technology has broken this “dirty press” paradigm, allowing printers to realize the many benefits of platemaking without a plate processor.

The birth of process free technology: analog-UV plates

The concept of process free plates goes as far back as 1995, when 3M patented and then commercialized an analog-UV process free plate. **Kodak Polychrome Graphics DirectPrint** Plates, launched in 2001, were based on the same technology.

Driving these innovations were the same customer values that exist today: the desire to reduce costs, reduce time to a press-ready plate, and reduce environmental footprint.

A small number of customers were prepared to accept the risks that come with any new technology, riding the wave of innovation as typical early adopters.

Process free plates are plates that do not need to go through a plate processor before they are mounted on press. During the startup of the press, the absorption of the fountain solution prepares the coating in the non-image areas to be physically removed by the tack and shear of the ink.

This enables a successful transfer of the coating from the plate to the blanket, and the coating is then carried out of the press, in almost all cases within the first several makeready sheets or newspaper copies.

Unfortunately, these analog-UV plates showed fount contamination and roller build up, depending on press conditions and working practices. Many of the maintenance fears associated with process free plates stem directly from these innovative first-generation plates.

The next phase: digital thermal process free plates

When thermal digital imaging was introduced, a true process free plate was one of its early promises. Unfortunately, early low power imaging devices could not support a commercially viable process free plate. The first commercially available thermally imaged process free plate, the Agfa Thermolite Plate, was not a success. Ultimately its use was restricted to the highly-controlled environment of on-press imaging where fount choices, filtration, etc., could be carefully controlled.

Kodak R&D breakthroughs result in successful process free plates

Recognizing the value process free platemaking would bring to our customers, Kodak has invested in years of materials research and plate formulation development to break the design constraints that led to the press problems.

In 2005, Kodak launched the first commercially successful process free plate, the **Kodak Thermal Direct** Non Process Plate. There are now over 2,000 sites worldwide using this plate in daily production across a wide range of conditions: on sheetfed, heatset, and coldset presses; with integrated and non-integrated fount systems; and with alcohol founts, alcohol substitute founts, alcohol-free founts, process inks, Pantone inks, metallic inks and UV inks.

Why has Kodak succeeded where others have not? Kodak has succeeded by refusing to accept the assumption that a process free plate must contaminate the press.

Kodak has now introduced the next generation of plates with its unique Press Ready Technology, which, due to expanded capabilities, makes process free a reality for a larger population of printers. The **Kodak Sonora** XP Process Free Plate is designed for commercial and offset packaging applications, and the **Kodak Sonora News** Process Free Plate is designed specifically for newspaper applications.

Kodak's Press Ready Technology Developments

Ultrathin, single-layer coating to prevent fount contamination

A fast plate technology is necessary to generate the crosslinked image areas that will both adhere to the substrate and resist press chemicals, yet still allow the non-image areas to be removed in the unique chemical and physical environment during press start-up. For the analog-UV plates the

solution was a 2-layer negative working, photopolymer technology. The toplayer was necessary for fast imaging but contributed directly to fount contamination problems for a couple of reasons.

Firstly, two layers meant a high coating weight. The **DirectPrint** Plate had a total coating film weight of 1.4 g per sqm, and so there was a lot of material to remove during start-up. Secondly, the toplayer resins were very hydrophilic, i.e. water-loving. During press start-up, the toplayer could dissolve in the fount with the potential to disturb the fount system and cause build up of materials on the rollers.

Kodak chemists have developed proprietary materials to provide the required imaging speed within a single, ultrathin layer. At 0.9 g per sqm, the coating of **Sonora** Process Free Plates is 36% lower than the **DirectPrint** Plate coating, and it does not use any of the hydrophilic resin that led to contamination.

Sonora Plate users simply need to follow the manufacturer's recommended fount system maintenance for trouble-free running.

*Stress-testing fount solutions with **Sonora** XP Plates*

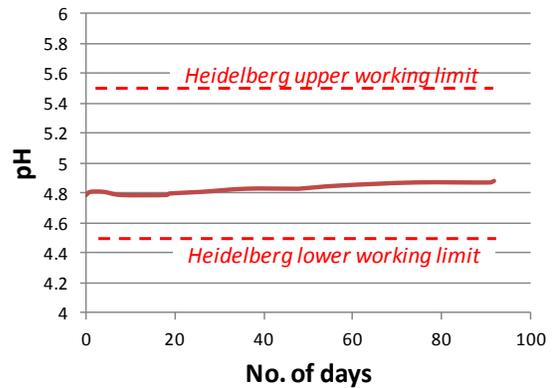
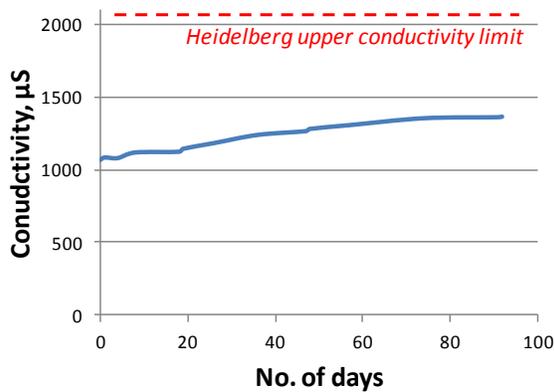
Within Kodak's technical testing facility in Leeds, UK, many tests are completed during the development of a new product to ensure it meets our customers' demanding requirements. In many cases, the test conditions are "stressed" to force failures that may occur under unique conditions of customer use. For our process free plates, these stress tests include cycling plates on the press and closely monitoring the press systems.

The cycling stress test for **Sonora** Plates was completed on a Heidelberg SM74 4-colour press. A number of conditions were set to stress the system:

- The fount solution was not changed for 92 days, far above the recommended 14-day recommended renewal, which increased any potential contaminant concentration 6 times.
- The plates had only 10% image area, increasing the amount of non-image area to be removed from the typical 70% to 90%.
- The press was run in non-integrated mode to force potential fount contamination.
- The fount volume was reduced from 77 to 67 liters, increasing the concentration of any potential contaminant by 15%.
- The multiple runs were all short.

These stress conditions more than doubled the potential effects of any contamination. A total of 220 4-colour sets were completed—three to four sets every working day for 92 days.

Over the period of the test, fount conductivity increased only 300 μS —well within the 1,000 μS limit that Heidelberg recommends for a fount change. This increase is similar to the change seen with wet processed plates on the same press. The pH changed 0.1 units, well within the 0.7 unit operating range recommended by Heidelberg.



In addition, there was no unusual buildup of materials in the fount reservoir, filter bags or fount rollers.



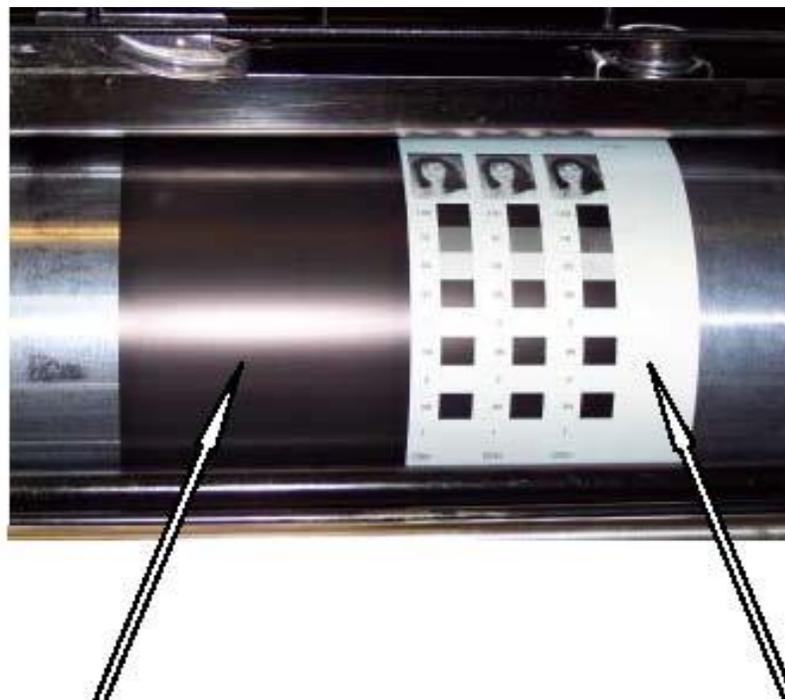
Particulate resin design to remove coating from the non-image areas

Having removed the pathway to fount contamination, Kodak had to take the next step, which was to ensure the clean removal of the coating from the non-image areas of the plate.

In a traditional wet processed plate, the coating is removed in the processor by manipulating the chemical structure of the resins and dissolving the coating with the aqueous processing chemicals. However, a process free system cannot use the aqueous fount on the press to remove the coating because the fount will become contaminated.

Kodak engineers were able to find a new method to remove the non-image areas via the ink. The key invention was a new resin in the form of particles.

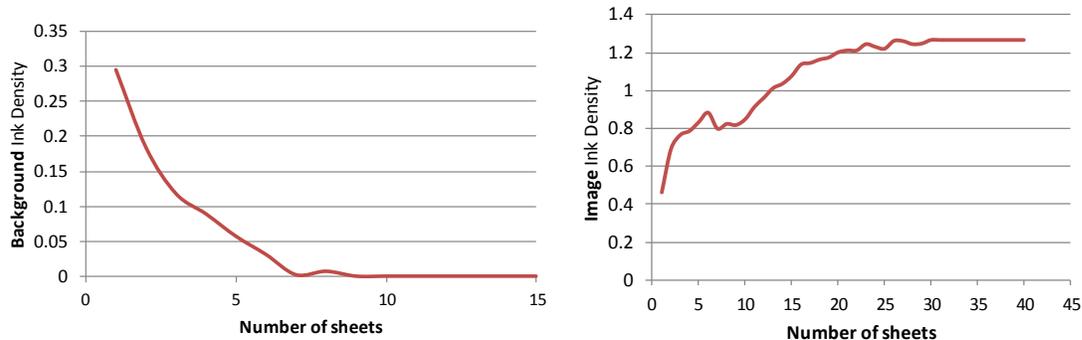
The image below shows the dramatic effect of particulate resin design after make-ready. On the left is the makeready of a plate with the resin homogeneously dispersed in the coating. On the right is the makeready of a plate with the same resin in particulate form. During start-up, the aqueous fount did not remove either coating, demonstrating that the coating was not being removed by the fount. Then, during the roll-up the ink has removed the non-image area only of the particulate resin plate, the plates are pictured below after the 10th impression.



Distributed resin

Particulate resin

A look at the makeready sheets of a typical **Sonora XP** Plate start-up illustrates where the non-image area coating goes. The background density on the first sheet is not zero, as you would expect from a wet processed plate, but instead shows the result of the ink transferring the coating from plate to blanket to paper. The background ink density reduces to a clean background, indicating that all the non-image area coating has been removed from the plate, *before* maximum ink density is achieved and makeready is complete.



Delivering on the promise of process free

With Kodak's Press Ready Technology, the problem of press contamination has been resolved. Ultrathin coatings have eliminated fount contamination issues, and Kodak's particulate resin technology ensures that the coating from the non-image area is removed by the ink and transferred to press sheets without increasing makeready waste or time.

The worldwide acceptance of **Kodak Thermal Direct** Plates confirms that Kodak's Press Ready Technology has overcome the issues of previous attempts at removing offline processing. And now **Kodak Sonora XP** and **Sonora News** Process Free Plates allow a wider segment of printers to realize the benefits of this proven technology.

So rather than ask "Why would I want to use my expensive press as a processor?" printers should be asking themselves "Why would I want to continue to waste time, money, and environmental resources on an unnecessary plate processor?"

About Kodak

Eastman Kodak Company is driving innovation and change for customers in commercial, packaging and functional printing, and enterprise services markets with one of the broadest portfolios of technologies, products, and services in the graphic communications and commercial printing markets. Solutions from Kodak offer exceptional quality, streamlined production, and scalability to grow with our customers' businesses, and only Kodak provides digital and conventional solutions within a unified workflow. We are a worldwide team that performs with excellence, works with customers to help them succeed, and brings innovative solutions to market. For more information, visit graphics.kodak.com.