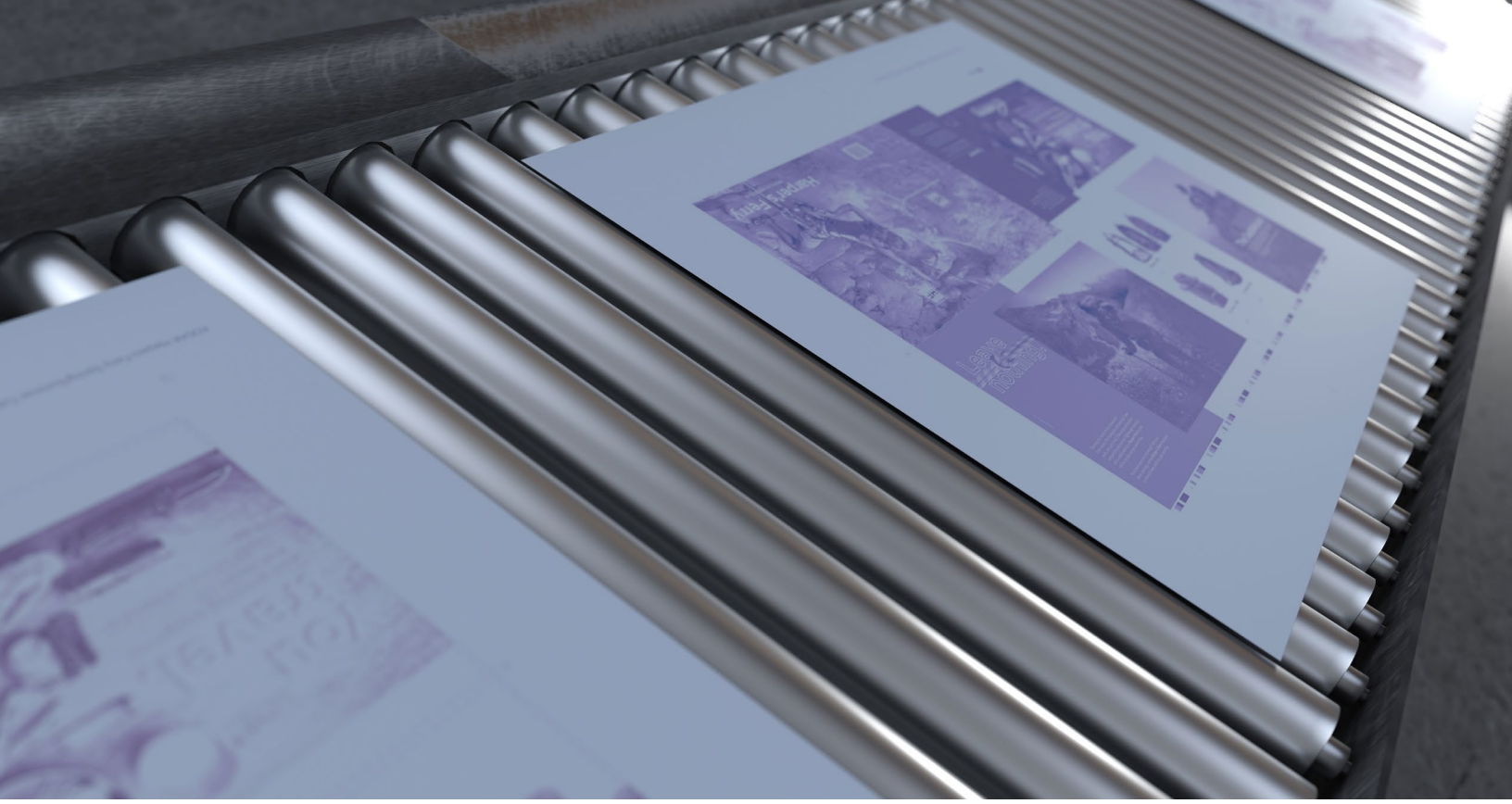
ROBUST PROCESS-FREE PLATES: What Does It Take?



KODAK SONORA XTRA Process Free Plates

Introduction

Print service providers (PSPs) are flocking to process-free plates like KODAK SONORA Process Free Plates because of their eco-friendly advantages and simplicity. Yet not all process-free plates are created equal.

Kodak introduced their process-free plate technology onto the market in 2004 and have spent more than 20 years pursuing plate innovation and boundary-pushing performance in their SONORA Process Free Plate line. From Thermal Direct to the newly introduced KODAK SONORA Ultra Process Free Plates. Now more than 6,000 printers worldwide use SONORA Plates in diverse and demanding conditions for their sheet-fed and web-fed operations.

PSPs should look closely at how a process-free plate performs under their typical operating conditions. This paper discusses why a plate's robust performance under a range of conditions is critical to printers and how Kodak's most recent process-free plate technologies set SONORA Process Free Plates apart.

THE FIRST STEP

Unlike conventional wet processed plates, process-free plates do not develop and become print-ready until they have come in contact with fountain solution and ink. On press, the fountain solution wets, penetrates and swells the unimaged coating on the process-free plate to prepare it for removal. The ink then removes the coating, which is transferred to the substrate during the make-ready process. It is the interaction of these fluids with the plate that completes the on-press processing. That is the underlying concept that is essential to developon-press (DOP) plates. As you can imagine, a lot is going on from a chemistry perspective, and for a process-free plate to be successful, it has to work well with a range of different fountain solutions, inks and press start-up sequences.

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One key advantage of SONORA Plates is that the image on plate has a high contrast to its background, unlike some of its competitors' plates. This means that you can see the image and have a high level of confidence that the plate is ready to go on press. The high contrast of the image area on SONORA provides an important clue about the viability of the plate. (For an extended discussion of this topic, see the Kodak white paper entitled "Process-Free Plates in Your White-Light Print Room Environment.")

Of course, one good feature is not enough to make a plate successful. The whole plate design and performance from prepress through to the press run is key to delivering a robust printing plate. Any plate, conventional or process-free, has to withstand relatively hostile press conditions in which they are wrapped around plate cylinders, exposed to high levels of mechanical compression, subject to abrasion from paper lint, and extended exposure to chemicals in the inks, cleaners, fountain solutions, and solvents. And yet they must also be easy to expose and process, reproducing tiny dots and shapes accurately for run lengths of tens or hundreds of thousands of prints at very high speed. The photosensitive coatings that achieve these miracles are extremely thin, much thinner than a human hair, and they must be manufactured consistently and shipped with care around the globe. (Note: Kodak is the only plates manufacturer to maintain factories around the world: Columbus, Georgia in the United States; Osterode, Germany; and Gunma, Japan.)

SIMPLICITY IN DESIGN AND ROBUSTNESS IN PRACTICE

Some process-free plate designs require a topcoat, which creates some complications, as we shall soon see. In short, the use of a topcoat complicates the development-on-press mechanism, slows the speed of development, which impacts make-ready time, and plays a negative role in ink receptivity and the plates compatibility with the wide array of press fount and inks used around the world. As the print run goes on, plates of all types must be resistant to blinding, compatible with a wide range of fountain solutions and inks, and avoid press contamination that threatens the cleanliness of a printing press. The use of a topcoat adds an extra unnecessary complication to the process, greatly increasing the chance of press contamination and results in a plate with diminished on-press capabilities. Because of these challenges, Kodak deliberately chose to avoid a topcoat in its SONORA Plate technology, aiding its robust on-press performance.

SPEED OF MAKE-READY

One of the most important aspects of SONORA is that its make-ready speed is extremely fast. Tests of SONORA XTRA Plates show that it can be up to density and ready to print as quickly as, or even quicker than a wet processed and gummed plate, regardless of the fountain solution type, while competitors may take significantly longer, performing differently depending on the fountain solution type and whether or not it contains any Isopropyl Alcohol (IPA).

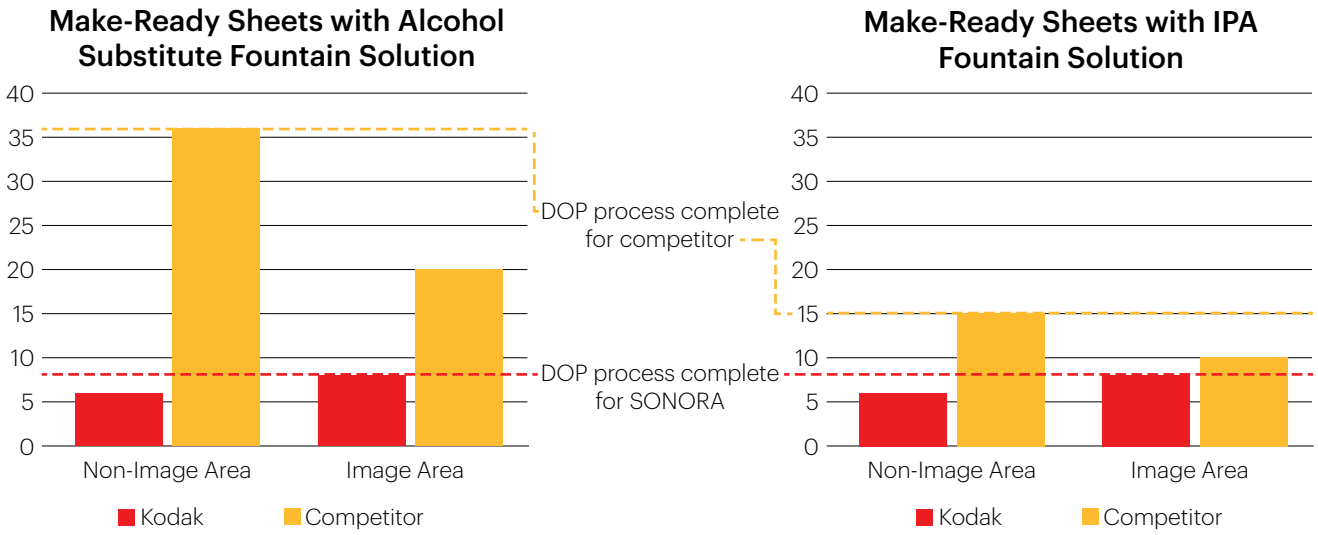

Figure 1: Make-Ready Sheets Required; *Source: Eastman Kodak company internal tests*

Figure 1 shows a face-to-face comparison based on testing of SONORA XTRA Plates versus one of its process-free competitors. For a plate to be ready to print, its non-image area must be clear, and its image area must be able to produce a standard density level. So while it is important to reach the desired maximum density, the job is not ready to run until the non-image area is clear.

It is worth noting that SONORA XTRA Plates performs virtually identically with both of the tested fountain solutions, one with an Alcohol Substitute and the other using IPA. The competitor's process-free plate not only under performs compared to SONORA XTRA, but its make-ready time worsens with the Alcohol Substitute Fountain Solution. The use of a topcoat contributes to this poor performance, resulting in unnecessary paper waste.

“The competitor’s process-free plate not only under performs compared to SONORA XTRA, but its make-ready time worsens with the Alcohol Substitute Fountain Solution.

Alcohol Substitute Fountain Solution (Cyan Print)

Isopropyl Alcohol Fountain Solution (Cyan Print)

SONORA XTRA | Competitor | SONORA XTRA | Competitor

Figure 2: Development Status at Sheet #6; *Source: Eastman Kodak company internal tests*

The results of inconsistent development on press can be seen in Figure 2, which compares the state of the SONORA XTRA Plate versus a competitor under the same two conditions: one with an Alcohol Substitute Fountain Solution and one with Isopropyl Alcohol Fountain Solution. The images on the left shows the state of the cyan print after six sheets have been run using an Alcohol Substitute Fountain Solution. The SONORA XTRA Plate, as shown Figure 1, has a clear non-image area and is basically ready to print after a handful of impressions. The competitor’s plate is still indistinct. It is fully inked in the non-image areas that should be running clean and the image areas are running virtually blind, in other words, its non-image and image areas have barely begun to develop. The non-image area is not clear, and the image area has not fully emerged. This means it will need several more sheets before it is developed fully and can be run. The images on the right shows the cyan print after six sheets running with an Isopropyl Alcohol Fountain Solution. The results with SONORA XTRA are similar to the cyan print with Alcohol Substitute Fountain. The SONORA XTRA Plate is ready to run while the competitor’s plate, although it is further along than with the Alcohol Substitute Fountain Solution, has not completed developing, and will not do so for several more sheets. This inconsistent development of competitor’s plates makes the process more costly and less efficient for printers.

Figure 2 provides a visual example of the impact of a topcoat, as it introduces inconsistent performance across different press fountain systems and slows the development and make-ready time on press. You can also see the consistent performance across fountain solution types in the SONORA XTRA example. Faster and more consistent development on press and make-ready has huge advantages in reducing paper waste, saving time and money, and giving you greater flexibility in consumable choice (fountain solution and ink).

The subpar make-ready capability of competitors has additional implications. During make-ready as the nonimage areas develop, large amounts of ink are taken up on the plate and are transferred to the first few sheets. When development is slow, as with the competitive example shown in Figure 2, this can lead to paper jams that complicate make-ready, lead to more paper waste, and can also cause press downtime due to very inky, sticky sheets jamming in the press or sticking to cylinders or rollers.

PLATE RELIABILITY: RUNNING LONGER AT HIGH QUALITY

Once the plate is developed, it also must operate effectively for the entire press run. SONORA Plates are rated for run lengths of up to 400,000 impressions on web presses, 250,000 impressions on sheetfed presses, and 100,000 impressions for UV-ink applications. In tests of a competitive plate that employs a topcoat technology, Kodak found that quality issues related to blinding appeared well before the plate's run length specification.

SONORA XTRA

Competitor

Figure 3: Long-Run Performance (SONORA XTRA Vs. Competitor); *Source: Eastman Kodak company internal tests*

Blinding occurs during a print run when the plate begins to lose its ability to differentiate between image and non-image areas. When this happens, it becomes hard to maintain the correct ink densities and achieve accurate tonal reproduction. You can see this most clearly in Figure 3 for a print using process colors and a green 'spot' color. As the print run progresses, the competitor plate begins to show issues with maintaining ink density with the 'spot' color beginning to run 'blind' on the plate. There is no on-press fix for this and it cannot be corrected by feeding more ink to the plate. The press must be stopped to clean and recover the plates and, if that is not successful, new plates need to be made. This can cause unexpected delays and press downtime as well as plate remakes.

SONORA XTRA Plates have been designed to avoid such blinding and can be used with confidence with any type of ink including mineral oil, vegetable-based bio-inks, PANTONEs, opaque whites, metallics, and fluorescents.

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PRESS CONTAMINATION

Another factor in favor of process-free plates like SONORA that do not use a topcoat technology is that they are less likely to contribute to press contamination. On a very basic level, it makes sense that limiting the components in a process-free plate technology will ultimately reduce the amount of contamination that can occur in the inks and fountain solutions. SONORA Plates achieve this with a single layer, unlike competitive process-free plates that add a topcoat as an additional layer.

Press contamination can occur in the fountain solution or in the inks. When the fountain solution is contaminated, it can cause a significant shift in conductivity, and lead to poor ink/water balance. Solutions to this problem may require additional filtration units or force the PSP to change the fountain solution more frequently. Contaminated fountain solutions may also be prone to bacterial growth, which requires taking the press offline for a thorough cleaning.

It is not only the fountain solution that can be impacted by contamination. Inks are also at risk. Kodak found poor ink receptivity in its tests of a competitive process-free plate that used a topcoat.

CONCLUSION

You have certainly already heard about the many significant cost and environmental benefits of replacing processed plates with process-free ones. Taking processing out of the equation means that you are done with the headaches associated with running developer units. You have eliminated processing waste; reduced your water usage; done away with the transportation of developer and disposal of the resulting waste chemicals, filters, and wipes; ended possible leaks and spills; and reduced your electricity consumption. All of this shows your customers and community that you take environmental factors seriously.

The next step is to be sure that you choose process-free plates that operate in a robust fashion. Are they capable of speedy make-ready? SONORA delivers. Will they work equally well regardless of the fountain solution you choose? SONORA delivers. Will they produce long runs without blinding? SONORA delivers. Do they employ a single-layer plate technology that greatly reduces the chance of contamination of the fountain solution and ensures good ink receptivity? SONORA delivers.

Are single-layer process-free plates superior to those that use a topcoat? We certainly believe so, and we invite you to experience for yourself the many advantages that come from the use of KODAK SONORA XTRA and SONORA Ultra Process Free Plates.

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