LUX Technology Enables Better Flexo Print

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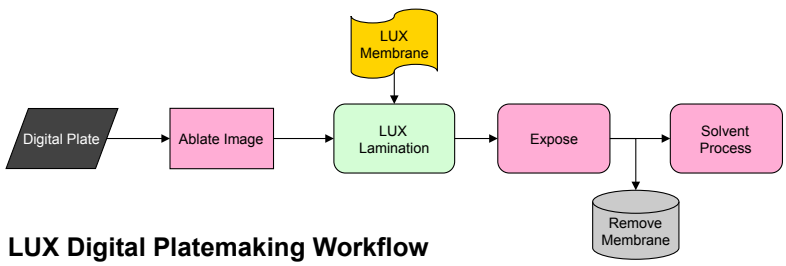
Flat-topped dots are not new. From the advent of photopolymer usage in flexo, everyone made flat-topped dots, because that was the only option. When you pull all the air from between a negative placed on top of photopolymer, a flat-topped dot inevitably results. And there was a lot of good flexo printing done with analog flat-topped dots. But the more efficient digital platemaking workflow brought with it bullet-shaped dots, which could be made remarkably (if in many cases precariously) small, and which had the natural cutback curve that made their resulting print gain look so good. Both the ultra-small dots and the favorable print characteristics were fortuitous side effects of oxygen inhibition of the photopolymerization reaction.

However, despite the major advances that the standard digital workflow brought with it, there were sacrifices required. Most striking was the need for a large 'bump' curve to make up for the fact that very small holes in the digital mask were *too* small to let enough UV energy through to form usable dots, if any were created at all. In what has become standard practice, the work-around of chopping and stretching the tone curve to create small dots on the plate was adopted. Although effective in most cases, the 'bump' is yet another variable that has to be set and maintained in order to make plates print well. Plus, the structure of the very small dots that digital flexo platemaking yields adds another challenge – even if the smallest dots are held, their rounded tips and vertical shoulders make them very impression-sensitive and prone to folding over on press. Both of these issues can compromise the quality of the 'fade to zero' vignettes that such fine dots should make possible.

Well, not for the first time in human history, we have made progress by learning from our past, and can now combine the best aspects of flat-top dot geometry and digital workflow into a new option that looks to be the next step in flexography's technical evolution. By keeping the factors that make digital flexo successful (digital workflow, high-quality imagers, multiple plate options) and addressing the compromises previously required (structurally weak highlight dots and a 'bump' curve), the new LUX platemaking process (Figure 1) from MacDermid Printing Solutions delivers a practical and simple option for those seeking to increase their print capability and take some business from gravure and offset.

It is useful to explore the difficulties in standard digital flexo platemaking in order to understand how the LUX platemaking process addresses this situation. First, consider the highlight dot formed by a standard digital platemaking process (Figure 2). The dot has a rounded tip and steep shoulders. But where exactly is the inked/printing surface of this dot? In practice, it is process dependent; it varies with anilox-plate and plate-substrate impression levels. Push the plate harder into either the anilox or the substrate, and ink will be forced further and further down the rounded top surface of the dot. Compare this dot to the LUX digital dot (Figure 3), which has the same steep sides, but a well-defined top surface, as defined by the clear edge that distinguishes the top of the dot from the side. Once the dot's printing surface (the top) and its support structure (the side) are clearly separated, they can be independently controlled and optimized.

Figure 1



LUX Digital Platemaking Workflow

Figure 2

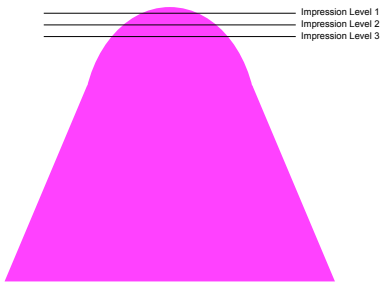


Figure 4

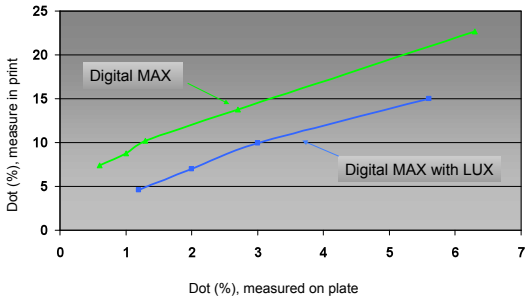
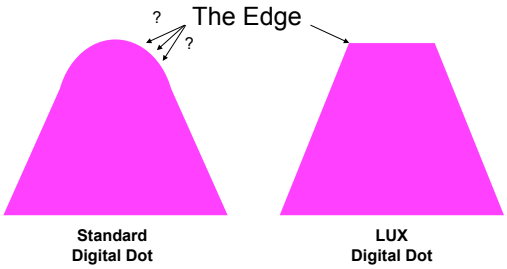


Figure 3



Smaller printed dots are the critical path capability for reaching the 'next level' in flexo, and LUX enables their creation. .Although industry-standard measurement tools like the Beta flex measure LUX dots as larger than the smallest standard digital dots, the LUX dots print with less gain and actually yield smaller *printed* dots (Figure 4).

Of course, to get the best out of LUX, you will need to adjust your prepress to take advantage of the 1:1 mask:plate imaging characteristics LUX delivers, and adjust your gain curve to achieve your color management targets. A three-stage protocol has been developed that allows the systematic definition of the adjustments needed:

1. One-color print test to define the LUX print gain curve. This can also be used to test backing tape, anilox, and other options at the same time. From this test, the needed 'cutback' curve is defined.
2. Four-color print test to verify the cutback curve and define the color space with the LUX plate.
3. Full production jobs with optimized prepress and print conditions.

This protocol has been repeated many times in locations across the globe, and LUX is in daily use worldwide.

If the print benefits of LUX dots were not enough reason to take a serious look at this option, the ease of integration into existing digital platemaking makes it even more appealing. There is no huge investment in new equipment with LUX. It does not interfere with your established digital workflow, and it does not restrict platemakers to one plate. The LUX process requires only the addition of a laminator, a proprietary membrane laminate, and about 5 minutes of time compared to an existing digital platemaking workflow. LUX works with all MacDermid digital flexo plates, from Digital MGC (low durometer) to Digital MVP (mid durometer) to Digital MAX (high durometer), as well as Digital EPIC, a capped mid durometer plate. It can be used with plates from 0.045 in / 0.1.14 mm up to 0.250 in / 6.34 mm in thickness, and plate sizes all the way up to the largest available - 52 x 80 inches. You do not render all your existing files obsolete, because you can use LUX when you need it, and use your standard digital workflow when you don't. And because it uses existing photopolymers, the materials themselves are already proven to be durable, cost-effective, and dependable. And this confidence is backed by the millions of feet of printing experience already gained since LUX was introduced in May 2010.

LUX offers platemakers and printers an entrée into the world of flat-topped dots that is effective at raising the capabilities of flexo print while also being simple, versatile, and affordable. Because innovation in flexo isn't about miracles, it's about making it easy to get better results.