

# PrintWeek

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## STRATEGY



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**JOB OF THE WEEK**  
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# Flexo turns to flat-top dots

Flexo's digital dots often lack sharpness, but two US firms have pioneered techniques requiring no compromise of quality. By *Karen Charlesworth*



**"The results must be seen to be believed"**

**Chris Green, PRP**

The quality of flexo printing has notoriously always taken second, or even third, place in the printing industry to other print processes such as offset litho and gravure. That's mainly down to the relatively poor quality of dot that the average flexo plate can resolve. But the race is on to discover, develop and market a higher-quality dot – and in the next decade, the fluted, ghosted effects typically associated with flexo could become a thing of the past, allowing flexo to produce results easily comparable with offset litho.

There are currently two main participants in the flexo dot race: Kodak, which has taken a 'whole system' approach encompassing plate and top thermal layer, platesetter, laminator and even a workflow; and Precision Rubber Plate (PRP) Flexo, a third-generation family-owned trade flexo plate-maker based in Indianapolis, US. PRP's approach is process-based: the company claims to have eliminated the processing factors that retard the formation of a high-quality dot.

PRP has a long history in flexo innovation. In the 1960s, it invented Corrotone, a patented process that allowed the world's first printing of halftone screens on corrugated board – until that time, the process had produced results of such poor quality it was untenable. Since then, the company, under the R&D directorship of 'Professor' Ned Wier, has developed several other processes that improve the quality of flexo printing, including a capping technology for use with liquid photopolymers, and a 'cast-on-foam' technology. But with the new Digital ExSpect plate, general manager Chris Green believes PRP may have its greatest-ever hit. "This gives an excellent flat-topped dot structure, and the results must be seen to be believed," he says.

## A step ahead of the rest

The Digital ExSpect plate originally began life as an analogue offering: under Wier's leadership, the PRP team had been looking at improving the quality of the dot profile. But when the digital revolution began to hit the flexo sector back in the 1990s, "that really focused our efforts," says Green, "because we started to look at the digital dot we were able to produce for our customers, and we didn't like what we saw." In 2005, PRP bought a DuPont and an Esko CDI digital platemaker, "purely so we could tell people we were keeping up with the technology," Green says. "In reality, we were two steps ahead of the quality produced by that technology. Those two platemarkers make our second-best plates."

Digital ExSpect is not itself a plate, for all that PRP calls it that. It is a branded plate – DuPont, Asahi, MacDermid – produced using the Digital ExSpect process, which remains the

intellectual property of PRP and is not for sale in the form of a platesetter, a plate, a workflow or any combination thereof. Instead, the plate is produced using PRP's own-modified equipment, and shipped out to customers. Green is understandably coy about describing the process. "It isn't one single thing that improves the overall quality, it's a series of interlocking things," he says. "It begins with the workflow at the front end, and it eliminates negative factors that contribute to the build-up of photopolymer." It doesn't take a rocket scientist to work out that PRP is eliminating – or at least drastically cutting back – the oxygen that's present at the polymerisation stage of the plate development process, but quite how that's done is a matter of speculation.

## Oxygen elimination

Kodak is also hot on the trail of rogue oxygen in the development process, and its system approach also aims to combat the effects of oxygen. The heart of its system is in the combination of the thermal imaging layer and the plate: the imaging layer is ablated using Kodak's SquareSpot technology (developed originally by Creo for use with stochastic and high-definition screens in offset printing) and then laminated to the Kodak Flexcel NX digital plate, ensuring what Kodak calls "intimate contact" between the two layers, "eliminating all oxygen and allowing full amplitude, flat-top highlight dots to form during UV exposure," according to Vic Stalam, vice president of Kodak's packaging products division.

So precise is a flat-topped dot that the traditional measures taken by flexo printers – and trade platemarkers – to compensate for the limitations of the normal digital dot are no longer relevant. PRP has worked out "completely different" profile curves that are applied to the digital file. Green explains: "Typically, everyone's been applying profiles to the file to bump the low end of the range. You might take a 50% dot back to 40%, but bump a 2% dot up to a 5%, to allow for the dot's reduced capability to transfer ink to the substrate." With the Digital ExSpect plate, Green says, "a 10% dot in the mask reproduces as an exact 10% dot on the plate. We have several customers for whom we're not actually applying any curve at all."

That a flat-topped dot produces cleaner, crisper and more detailed print is clearly evident. Perhaps more surprisingly, it also produces a wider range of colour. "On an ordinary digital plate there are 256 levels of grey, but the compensating curve limits the number of levels of grey that can be reproduced," says Green. He compares a flat-topped and an ordinary digital dot thus: "Imagine inking up the bottom of your coffee cup →

and printing rings with that – you get a clean, sharp result every time. But then imagine inking up the skin of an orange – the ink transfer varies, the edges aren't precise because it's compressing more, and you get a blurred result."

Kodak's Stalam also identifies that flat-topped dot plates "resist plugging with ink and therefore have less downtime for cleaning, which often destroys highlight dots". A flat-topped dot also makes it possible to print a solid and a half-tone on the same plate, whereas with a normal dot printers often find they need to do two passes. And where flexo printers have traditionally specified their barcodes with a 7/1000 reduction in width to compensate for dot gain, a flat-topped dot plate means they can specify a barcode to its original width and still make it scan at the checkout.

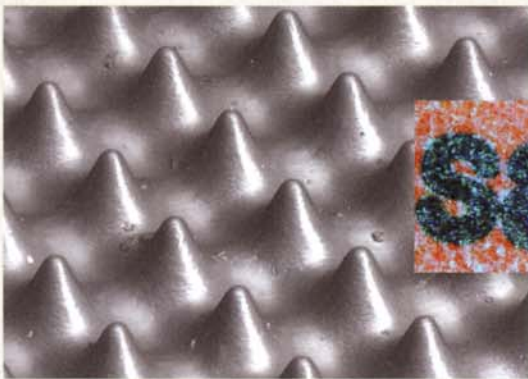
Brand loyalty is rife in the flexo print sector. "Printers now tell us the X thickness of photopolymer from Y manufacturer' and you have to produce the plate to that spec," says Green. Fortunately then, the Digital ExSpect process is brand- and gauge-agnostic, able to be used with any gauge of any brand of photopolymer plate, "and neither do the printers have to change anything on-press," Green points out. It's not clear what this dogged brand loyalty will mean for Kodak, whose proprie-

tary solution centres on a new grade of its existing Flexcel plate, the NX, and may therefore encounter a slower-than-expected take-up from printers not already using Flexcel plates. "I think we've stolen their show," says Green, "by being able to do it on a preferred plate material for no extra cost."

As ever, the improved technology is also beginning to have a market effect, particularly in the US where PRP has been selling flat-topped dot plates for two years: "We've got more customers in the mid- and low-quality brackets than in the high-quality end," Green says. "They find that the dot gives them a quality edge to open the door to higher-end customers, possibly pinching them away from the bigger printers."

Are flat-topped dots more pricey than regular ones? Not much, says Green: it works out between 8p and 16p per square inch, typically around 5-10% more than ordinary digital plate production costs, at trade rates. Kodak has not yet released UK prices for the Flexcel system, although the capital costs will inevitably boost the cost-in-use over the PRP plate-only offering. And UK customers who want to use the PRP plates need not despair: the company says it can turn a set of plates round – from receipt of digital artwork to delivery back to the customer – within three days, continent to continent. ■

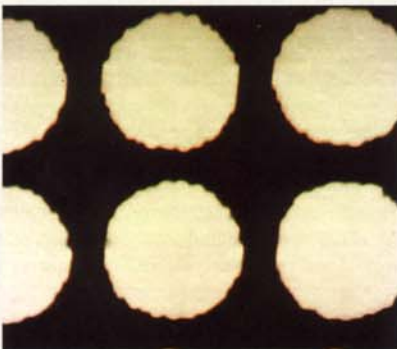
## WHAT IS IT? THE FLAT-TOPPED DOT



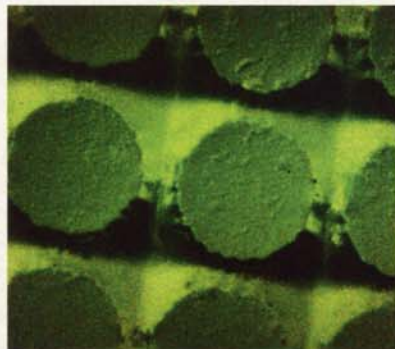
1 Conventional digital plate showing a 7% dot at 102lpi



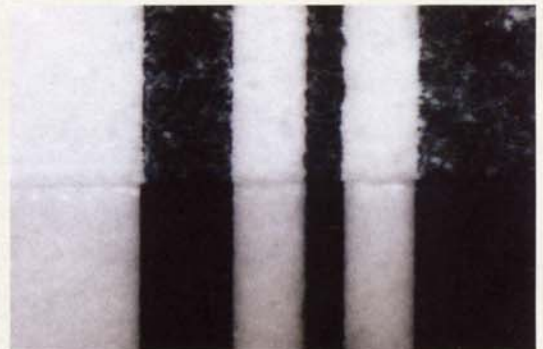
2 Flat-topped dot plate showing a 2% dot at 102lpi



3 The ablated mask, where the light area represents the intended halftone dot



4 The flat-topped dot created from the mask (an almost exact replica of the ablated mask, where a normal digital dot would be much smaller than these dots)



5 An image in two halves, showing (bottom) a film positive of a barcode, and (top) the printed result using flat-topped dots, giving almost no difference between print and negative

An ordinary flexo platemaking process produces dots that look like a series of sharp-pointed peaks, with broad curves separating them (1); by contrast, the flat-topped dots appear as castellated rows with clearly identifiable sharp 'bevels' between the dot and the non-print area (2).

A flexo dot picks up ink from the anilox and transfers it to the substrate. But because a regular flexo plate's dots are peaks rather than flat-topped,

they are prevented from transferring ink precisely from their top face – the 'peak' compresses during contact with the substrate, transferring ink from the sides of the peak as well as its pointed tip. In fact, a halftone dot of less than 7% may not quite reach the surface of the finished plate. A flat-topped dot, by contrast, gives a more accurate transfer of ink with the appropriate amount of compression (see 'safe' print at top left of (1) and (2)).