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The Digital Dots
Buyer's Guide to CTP

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The Digital Dots Buyer's Guides

This publication is part of a series of independent buyers' guides for publishers, graphic arts professionals, printers and print buyers. Buyer's Guide titles provide straightforward explanations of how technology works, what it's for and considerations for investment.

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About Digital Dots

Digital Dots is an independent graphic arts research company established in 1999. The company is a collection of like-minded graphic arts consultants, pixies and professional journalists specialising in digital prepress and publishing technologies. Digital Dots provides exclusive market research, testing and evaluation services for prepress and publishing applications, and publishes a monthly newsletter. Spindrift is the industry's only truly independent resource for graphic arts news, analysis and comment, and has a rapidly growing worldwide readership.

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Thanks to Todd Brunner for production and layout under fire.

For John W. Seybold, 1916–2004
The father of digital typesetting

Introduction

Welcome to the Buyer's Guide to Computer-to-Plate

For many commercial printers and publishers computer-to-plate production is already a reality, but for a great many more it is not. So if it's so great why doesn't everyone use it? Well, there are many reasons for not going direct to plate but for most people the biggest barrier is uncertainty. With so much to choose from, making the right investment decision isn't easy. Knowing that something is a good idea, and knowing that you're making the right investment choices are not always the same thing. That is what this Buyer's Guide to CTP is all about. It is intended to help printers, prepress professionals and their customers understand CTP production. It will be useful to anyone who buys print, from marketers to publishers.

In the following pages we cover everything you need to know about digital metal platesetting. We introduce basic CTP concepts to set the scene, and explain the various ways in which digital plates are imaged. Consumables are central to the CTP investment proposition, so we have also explained in some detail the characteristics and attractions of different kinds of metal digital printing plates.

We also explain how other production factors influence a CTP workflow, and we've thrown in a couple of case studies, by way of illustration. These show how CTP was implemented and why. The Guide concludes with an overview of the latest CTP developments.

This guide is not exhaustive. We have not addressed polyester plate imaging, a dynamic market but one that is very mature and with clear benefits. We have also not gone into much detail about imaging conventional UV plates. Direct UV platesetting is still relatively limited, primarily because powerful UV lasers and fast modulators have been too expensive. However this area is changing rapidly, particularly as laser power levels rise and modulator prices fall. If one considers that the ideal printing plate is cheap, durable and environmentally friendly, conventional plates meet two of the three requirements. Both thermal and photopolymer plates are intermediate, and processless is environmentally friendly but not particularly cheap or durable. Cheap, low cost UV platesetters could change the entire CTP landscape, but that hasn't happened yet.

Another developing area is in the use of inkjet technologies for platesetting, defining an image or nonimage area with ink. Although there have been technology demonstrations for several years, this is not a particularly stable or widely acknowledged means of imaging plates.

Successful investment is about choosing the right technology for your business. But the choice is also about getting the best service and support deal for your company. Cost of ownership, investment protection, adaptability for changing production needs, all these need consideration alongside the technology. With the Buyer's Guide to CTP technological concerns should be the least of your worries. We hope you find this publication useful and welcome your feedback.

Taking the Computer-to-Plate Plunge

It's very easy to assume that everyone in the printing business is making the move to computer-to-plate production. However there are still plenty of printers who have yet to be convinced that CTP is the way to go. This isn't really so surprising because printing is about controlling the mechanics of getting ink on paper, and crucial to that process has been the quality of the plate imaging. CTP requires printers to take a big leap of faith and hand over platemaking control to a computer, so understandably many printers have been reluctant to make the move. But as competitiveness in print increases, the time to hesitate has passed. Technologies are mature and stable, and no longer is shifting to CTP a dangerous leap into the unknown. Instead it is fundamental to survival in virtually all areas of the printing business.

Why go CTP?

For a long time the main reason to stay with a film based production line was lack of confidence in digital technology. Early CTP systems were unproven, expensive and did indeed require careful handling, but none of these arguments holds true today. There is no reason to doubt the stability of plate imaging technologies or of digital plates. CTP production is mature and proven in all sectors of the printing industry. Today investment into CTP technology is a sound and necessary move for pretty much any commercial printer.

The arguments for going direct to plate are well proven, and for many printers around the world computer-to-plate production is an established fact of life. These printers benefit from faster turnaround, quality through printing with well defined first generation dots, tighter registration and consumables savings. The price of digital plates is coming down, there is no film processing stage and getting up to colour faster on press means less wasted paper and ink. Many printers were initially reluctant to go to CTP because the price of plates was high. Plate prices have come down and this, combined with substantial labour savings gained through doing away with film, changes this view. Saving the expense of manual film stripping and plate making is an important contribution to the investment decision. Another important reason for going CTP is the benefit of an all digital workflow, even though for many printers this can be one of the more traumatic aspects of CTP. Increasingly suppliers are developing workflow and output management systems that work with engines built by their competitors, such is the stability of plate imaging technology and the flexibility of digital control systems.

Embrace the digital workflow

Probably the biggest barrier for printers who have yet to make the move, is the need for a wholly digital workflow. Direct to plate output assumes that everything is produced in an electronic form and managed digitally. Shifting to a digital workflow can be an anxious business, but an efficient digital system is now vital to continued success in printing. Fortunately advances in the mechanics of digital platesetting have been matched by advances in digital workflow management, and in digitisation tools. Even if supplied artwork or films need to be incorporated into the workflow, the technology is available to do it. Colour contone and copydot scanning were once highly contentious issues, but now high resolution capture of screened filmsets or colour images is routine. It is also relatively inexpensive and there are scanners on the market to meet most needs. In addition the rising use of high performance digital cameras is leading to an increased volume of digital originals, reducing yet further the need for image scanning.

Where to start?

When investing in CTP the most important consideration of all is the support of the people working with the technology. Involving operators and managers early in the process ensures that any investment choice is well informed. Operator involvement can also help build confidence and knowledge so that people are positive about working with a digital workflow and direct to plate production. The importance of training and education applies to customers as well, particularly if they have only limited experience of working digitally. Functions such as trapping, proofing and imposition can be fully automated, but unless everyone in the workflow has the confidence to use them and trust them, they can bring little benefit.

How to start?

Investing in CTP technology is easier now than it has ever been, particularly in a highly competitive market with a wide range of suppliers and technologies. Which supplier to work with and which technology to buy depend entirely on the type and volume of print a company produces, and on the speed with which it must be produced. This in turn is dependent on the press and plates used, so a good starting point for investment planning is the plate. What kind of plates are used? How long are average runs? How many plates are used per run? What quality levels are required? What resolution and line screens must be supported? How fast do plates need to be produced? The answers to such questions will help considerably to narrow down the technology options.

Investing in CTP can also be a good time to evaluate plate usage and supply. Many manufacturers bundle plates and platesetters but while this can be very good for the balance sheet in the short term, it may compromise long term flexibility. Agfa, Fujifilm and KPG are obviously in strong positions to offer good bundling deals, as is Creo which recently started to manufacture consumables. Bundling deals are available from their competitors too, with most CTP manufacturers offering plates rated for use with their particular platesetter line.

Who's who in CTP?

Commercial printers are spoilt for choice when it comes to devices for imaging paper, polyester or metal plates. This is one reason that it is virtually impossible to point to a single company and call them the dominant manufacturer. Suppliers are strong in different markets, and in different sectors of the printing business. A manufacturer dominant in the German B2 market may have no presence at all in the Swedish market. Similarly a manufacturer of Very Large Format output engines may not be well placed to supply a flexo platesetter for packaging. Market strength is specific to a print company's location and business sector, and this is an important consideration. It can affect product choice, capital investment costs, and support and consumables costs.

In Europe the big names in platesetting are Agfa, Creo, Escher-Grad, Esko-Graphics, Fujifilm, Heidelberg, Krause, Lüscher, Presstek and Screen. There are also many less high profile companies offering very solid technologies, such as ECRM, IPA and Highwater. A number of manufacturers offer products based on technologies developed by their competitors, including some of the big names. Branding a platesetter in this way makes a lot of sense in a market where consolidation and competitiveness have had such a devastating effect on the development community. It means that R&D money can be spent where it is most needed, instead of developing products that are largely similar. It is a cost effective means of completing a supplier's product range, without having to incorporate an often high return on investment value into the price to end users. It also allows customers to work with a single supplier if they prefer, and for newcomers to CTP having a single point of contact can be of immense value.

There is a general consensus that the most energetic area of the CTP market is the 4-up sector. Although the Very Large Format and 8-up sectors have led the CTP revolution, these markets are now fairly flat. They are by no means static however as they constitute a substantial business for replacement technologies. Thermal imaging based devices have dominated the commercial market for several years, but the wider market is going for violet imaging based devices in rising numbers. There is room for both in the industry particularly as plate prices fall for both technologies, and as the market as a whole is spurred on by falling prices.

Of all the digital investment options available to printers, CTP is one of the easiest and best proven choices a printer can make. Direct to plate production seriously benefits individual print companies. Efficient, high quality and competitively priced print adds to print's attractiveness and encourages user confidence in the medium. In this age of electronic and digital communications that has to be a good thing.

Developments in CTP Output

Making the move to computer-to-plate production is a clear route to reducing production time, improving output quality and reducing costs. Although many printers around the world have shifted to direct to plate production, there are still plenty who have been reluctant to take the risk, either with the hardware or the move to a fully digital workflow. Advances in hardware have progressed at a terrific rate over the last few years, so investing into CTP hardware is no longer difficult or risky. Stable output devices, reliable and consistent consumables, and a wealth of production experience throughout the industry, mean that there really has been no better time to get into this technology.

Now is the time ...

In the early days of computer-to-plate production, developers, manufacturers and users had a lot to learn about getting good results from direct to plate systems. New production skills, hardware refinements and workflows have all had to evolve to meet the demands of direct to plate output. CTP output devices and plates are now available to suit every conceivable press format from 240 x 240 mm to 1524 x 2032 mm. They are stable, robust and consistent. CTP is no longer about risk, but all about making the right choice for customers and using CTP technology for business development.

The secret's in the plate

A number of factors govern the investment decision for CTP engines, but conversations should start with the consumables. The plate is obviously the biggest factor in any CTP investment because the plate gets ink on paper or other substrates and it has to fit the press. Plates are also a recurring cost to be factored into the return on investment calculations.

For most commercial printers chemically processed metal plates are the only viable option. Fortunately there is a growing range of digital plates on the market and prices are getting increasingly competitive. Higher plate production volumes bring economies of scale and manufacturers are passing on cost reductions to end users.

Together plate format and performance requirements reduce the field of options for CTP. Plate performance is all about what the plate has to do, so a printer working with UV inks for very long runs needs a very different plate than the printer doing lots of short run, single colour work. Between these extremes there are all sorts of printing environments requiring similar plate characteristics, but for which there will be many diverse output device requirements. This is one of the reasons for the heightened competition in the CTP market, particularly in the B2 sector.

According to several suppliers it is in B2 platesetting that most activity is taking place. This market is large, highly competitive and embraces a huge range of printing applications. It is a market where both thermal and violet platesetters have gained broad acceptance, and consequently there is strenuous competition. There are strong arguments for both types of plate, but whether a printer should use thermal or violet plates depends on the performance required and the production environment, from speed of imaging to how much space the printer has available for the platesetter department.

Conventional UV

One option is to buy a platesetter that can image conventional UV plates. Basysprint has developed its UV-Setter technology over a number of years building a solid business on digitally imaging conventional plates. These engines are available in several sizes imaging at resolutions from 900 to 2540 dpi. The main reason for investing in this type of technology is the convenience and cost of working with UV plates. This technology remains attractive, although the low market share (under 5%) and concerns over speed and resolution have kept this more a niche technology rather than a mainstream CTP offering. Esko-Graphics has entered the UV market,with the Espresso UV platesetter, so this could well change.

Polyester & processless

Recent developments in polyester and processless plates are such that for many printers serving the short run market, these are now viable. KPG, Fujifilm and Agfa have all recently announced that processless plates will be available for imaging on a range of platesetters. Contrary to initial speculation, processless will complement rather than replace other forms of CTP. It eliminates chemical image development and this will appeal to printers without the space for a processor. It is also attractive to those who want to simplify the platemaking by eliminating another prepress variable. However although processless is exciting it may come at a price, for example in run lengths, so users should not fall into the trap of thinking processless is for everyone.

Hardware advances

Most new CTP hardware developments are about bringing down costs, and increasing an engine's scope for different types of work. One of the arguments in favour of VLF output engines for example, is the flexibility they provide for imaging a wide range of plate formats. However cost reduction is driving most current development. This is part of the attraction of violet diode based platesetters.

Violet vs. thermal engines

Optical systems based on violet diodes are relatively inexpensive, last a long time (probably longer than the platesetter itself according to suppliers) and can expose a plate quickly. Because they have only a few moving parts, they are also less costly to build. It all adds up to a compelling argument in favour of violet, but thermal imaging devices can image proofing material, saving the cost of additional capital equipment. They can also image flexo, waterless and processless plates, to serve different output needs. Thermal is capable of meeting the most stringent quality demands, and the plates are tough and long lasting, with some rated for runs of over two million when baked. Thermal plates can also be handled in normal daylight, so they are extremely convenient to work with.

Keep in mind the fact that platesetters evolve in tandem with consumables, so it has been inevitable that excitement over violet has encouraged numerous new devices in this area. The number of higher wattage violet imaging systems is rising, with developers all looking at the higher powered violet diodes for imaging photopolymer plates as well as silver halide plates. However the thermal market has not stood still. Screen's Ultima 32000Z for example is a twin head 32 page device that images 46 B1 plates per hour.

Agfa and Screen have introduced thermal devices based on Grating Light Valve technology which diffract single light sources into multiple light channels. The two companies have used this technology in different ways, but the net result is much faster imaging and so higher productivity. Screen's PlateRite 8800 uses a 512 element GLV beam modulator and images thirty B1 plates per hour at 2400 dpi. Screen's GLV based PlateRite 16000 images 23 16-up plates per hour. Agfa's XCalibur VLF 45 images 20 massive 820 x 1160 mm plates per hour at 1200 dpi also using GLV based imaging.

Developments in violet imaging have also encouraged developers in the thermal camp to make their machines more competitive, and to develop smaller format engines. Violet imaging has particularly impacted the 4-page and smaller (B3) formats, but such engines are also available for 8-page and VLF applications. Speed is rising with the introduction of devices based on higher energy diodes, such as the 60mW devices from Highwater and IPA.

For really long runs thermal imaging is still considered the optimal technology and there are many devices on the market. Mostly these machines are used in 8-up and VLF applications where throughput requirements and print runs are high. Creo is the leading supplier of thermal engines with devices available from 4-up to VLF, supporting a huge range of applications and workflows.

Apart from the Presstek Dimension 200 there are few 2-up thermals on the market at the moment but we expect this to change. Agfa also has a large range of devices, both thermal and visible light, as do Screen, Heidelberg and Esko-Graphics. All of these companies increasingly compete on the basis of cost, format, performance and above all service. Device choice is all about meeting the application demands, consumables options and dealing with a company with the engines and service you need.

Your service

Service is probably the most important part of the CTP decision. There is a considerable degree of technology sharing in the CTP business, so clearly hardware is no longer the issue it once was. Screen for example sells engines to both Fujifilm and Heidelberg. Rebadging Screen's PlateRite as a Topsetter gives Heidelberg a machine it can sell for the 4-up market without the associated cost of research and development. Today printers can focus of getting the right service and support, instead of worrying about hardware reliability.

Most suppliers can put together excellent training and service packages including consumables, so it is a good idea to work out the kind of service and support your company would need to transition to computer-to-plate. This should include a comprehensive training budget as going to CTP is also about taking the final step to a fully automated digital workflow. For many printers this can be a very big step and one that can almost be more complex than the CTP investment decision. With JDF becoming reality for competitive production it is even more important to provide workflow management training early on.

Investing in the right engine for your business still isn't easy, but it is a lot easier than it was a few years ago. It's no longer a risky business, and there is no better time to take the plunge.

Computer-to-Plate Imaging Pros & Cons

Computer-to-plate production isn't exactly the sort of topic one would expect to stir passion and fervour in the soul, but just try asking a supplier of platesetters about thermal or visible light imaging and then step well back. There's a good chance of fireworks, and a good chance they will be quite spectacular. Of all the issues relating to computer-to-plate production, the question of imaging technologies is just about the most volatile. It's a highly contentious issue for many people and their passionate belief in either technology seems to run deeper than mere commercial interest. Strange as it is to say, there are few people who do not have a strong opinion either way, and there are rarely half measures for fans of thermal or visible light imaging technologies.

Making the choice

For first time buyers of computer-to-plate systems the choice of plate and imaging technology are impossible to separate, which is why making the correct choice is so important. It takes a long and thorough evaluation of the plate requirements to appreciate the importance and relevance of arguments for and against visible light and thermal technologies.

Thermal imaging

Thermal plates have an aluminium base coated with a material sensitive to laser energy. The imaging process relies on radiated light, focusing it with lenses, bouncing it with mirrors or modulating it with defraction gratings to generate heat. Here too the exposure points depend on the amount and duration of light hitting the plate surface.Thermal imaging can be used for digital halftone proofing, so proofs and plates can be output on the same imaging engine saving equipment costs and ensuring output accuracy. Thermal imaging is also used for imaging waterless, flexographic and processless plates.

Thermal imaging uses intense heat to either remove or weaken the coating material from a plate's surface. The imaging technology is based on an infrared laser generating light energy at wavelengths of 800 nm and above. Thermal plates are coated with polymers sensitive to intense heat within a very specific range. Thermal imaging works in a couple of ways. The surface can be removed by ablation which causes it to effectively burst away from the base. Alternatively the laser energy weakens the chemical bonds in the plate's surface so that it will fall away either in subsequent processing or on press. Once exposed and processed, the plate's surface becomes extremely hard and durable.

This technology is capable of extremely tight and precise control over dot shape and size. The precision of dot exposure means it is possible to image 1 to 99% dots at 300+ line screens, with extremely straight sides and flat surfaces, for optimum ink transferral. These dots can be as small as 10 microns, which although too small to be universally usable on press, provide the printer with the best possible plate for rendering a wide tonal range.

Because of how it works thermal imaging technology yields some important benefits, many of which have to do with the plate itself. Thermal plates are very tough and will last a long time on press. The plates can be baked to last for as many as two million impressions from a single thermal plate. The other obvious benefits are in the final print quality. Sharp dots accurately placed provide the printer with a quality control benefit that can be passed on to customers, as can the benefits of stochastic screening. The tiny dot size is ideal for printing stochastic screens.

Stochastic screening makes an important contribution to quality and improves inking efficiencies. Because the dots are so precise, it can produce higher densities, smoother flat tints, more stable halftones, and affect mechanical dot gain. Stochastic screening doesn't form moiré patterns so it's possible to print reliably with more than CMYK inks. A collection of small dots has greater edge length than one large dot. In fact stochastic screening increases dot gain, compared to AM screens because ink accumulates at the dot's edges, hanging out beyond it.

Thermal imaging produces plates of extremely high quality and output resolution. They generally have greater repeatability and consistency than visible light equivalents, although this is questionable. Accurate repeatability depends on precise plate loading and punching. Thermal imaging's precision can mean that problems with the variable dot gain of different dot shapes and halftone line rulings are minimised so that overall plate behaviour on press is stable, predictable and reliable.

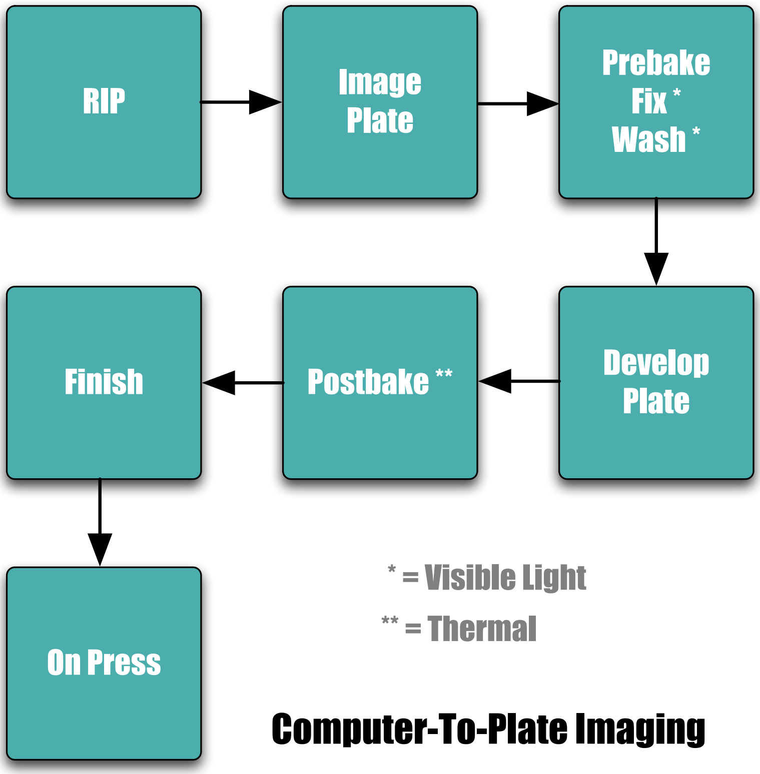
There are some arguments against thermal imaging. In some markets the plates can cost more than their visible light equivalents, and they are certainly more expensive than conventional UV. The energy required to expose thermal plates is greater than is required to expose visible light plates. This is an added cost to be taken into account and there are costs associated with the imaging technology itself, as the cost of a high powered infra red laser is reflected in the price of the platesetter.

Thermal in the market

The technology has been around for many years and well over 50% of CTP installations are thermal devices, primarily in the 8-up and Very Large Format (VLF) sectors. These markets also account for most of the world's thermal plate consumption, but for a number of years the VLF and 8-up markets have been relatively flat. The B2 market is currently showing the greatest investment activity. In this sector where printing applications vary so hugely, the relevance of arguments for thermal or violet are much harder to qualify.

Visible light imaging

The use of visible light to image a plate surface has much in common with film imaging technology. Like their thermal counterparts these plates consist of an aluminium base. However a visible light plate is coated with a light sensitive material, either silver halide or photopolymer based. When exposed to light the surface responds to create a negative or a positive image. The exposure points depend on the type of light hitting the surface and this in turn depends on the type of laser light source and optical system controlling it. Visible light imaging techniques can also expose conventional UV plates which has been attractive to many purchasers of CTP. UV plates are cheaper than their digital equivalents, and their use in a direct to plate production line makes possible support for hybrid workflows: digital data can be written direct to a UV plate and any film based material can be stripped in. This allows the printer some leeway in the workflow to support both digital and analogue content production, and there is no need to invest in copydot scanning technology unless content needs digitising for other reasons such as rescreening, archiving or re-use.



Computer-To-Plate Imaging

Visible light imaging uses laser light sources operating at specific frequencies to change a plate's surface coating. The use of light energy to expose digital plates has been around for years and is a relatively mature technology, widely used and stable. The recent development of visible light imaging systems based on violet diodes has stirred controversy and argument throughout the industry. Their use is attractive because it helps to bring down the cost of the optical system, and this affects the overall price of the platesetter. Violet diodes are long lasting which affects cost of ownership and return on investment. Because they use short wavelength light – as low as 407 nm – they work with smaller mirrors that can spin very fast for rapid exposure.

Violet diode imaging systems can expose plates fairly quickly and are simple to build because there are fewer moving parts. Also diode lasers don't need a modulator because they can be switched on and off very quickly. Thermal lasers, like YAG or argon lasers, are on all the time and need costly modulators (optical switches) to form the dots. This again affects cost. Violet sensitive plates can be used in a yellow light environment rather than a darkroom, making them more convenient to use.

But what really matters for individual printing applications? It's impossible to say because the relevance of all these arguments is so subjective. Unfortunately there is no such thing as a printing plate imaging technology that is ideal for all purposes. The debate between thermal versus visible light imaging has simmered for a while, but it has not reached such levels of passion until quite recently. This may be because the platesetting market is most active for B2 and B3 printing where the technological requirements may be harder to generalise. Both visible light and thermal imaging have their strengths and drawbacks, and it's important to keep sight of what is most relevant for a given application. There are good reasons for investing in both forms of imaging but in the end it all depends on the business' needs.

CTP Plates

Computer-to-plate production is no longer a possibility for the printing industry, it's a reality, even for packaging where computer to flexographic plate output is impacting the market. Going CTP yields substantial returns on investment, improves quality, pushes deadlines, saves costs and brings the benefits of a digital workflow. Many commercial printers, particularly in the B2 market, are upgrading workflows to eventually invest in CTP. For most printers, deciding the digital printing plate to use determines platesetter choice. Plate performance has been crucial to the success of the CTP business. With digital plate sales around 150 million square metres annually, this is a mature market with many suppliers, high volume manufacturing and competitive prices.

Choosing the right plate

Selecting the ideal plate depends on what the plate has to do. Printing plates put dot patterns onto a final substrate, without distortion and with accurate, consistent placement. The printing plate must be easy to work with, economic to use and last as long as the print run, if not longer. Plate choice is thus fundamentally important to any commercial sheet fed or web colour printer.

Metal plates are based on grained aluminium coated with UV or heat-sensitive layers. Light hitting the plates causes chemical changes so that weakened areas fall away during processing to create the imaging surface. One group of digital plates is exposed with visible light energy and one with thermal energy, with laser power at different wavelengths exposing the plate. Silver halide and light sensitive photopolymer based plates are imaged with visible light from 405 nm to 680 nm. Silver halide plates have an hydrophilic (water loving) anodised aluminium base coated with a high speed emulsion. Visible light photopolymer plates are coated with a film speed photopolymer. A thermal plate has an aluminium base with a thermally sensitive, possibly multi-layered polymer coating that responds to heat. Apart from processless plates, digital plates require chemical processing to develop the laser exposed coating and prepare the plate for use on press.

Silver halide

Since their introduction in the early 1990s silver halide plates have been widely used in printing, from newspapers to commercial print. Those imaged with red or green light are extremely sensitive to light and require red light handling. Violet visible light plates can be handled under yellow light and so are more convenient. Critics state that silver content makes a plate vulnerable to chemical interactions with processing chemicals, fount solutions and even ink and substrate materials. This is really only an issue in harsh environments such as on highly corrosive UV presses, where baked thermal plates are more suitable. Eroded silver in the processing chemistry requires disposal however and this involves cost.

Silver halide visible light plates cannot be baked for long runs, but used on presses from small B3 to newspapers, they have a reputation for robustness. They are extremely stable, consistent and reliable, support high resolutions and can render a wide tonal range. Economies of scale keep silver halide plate prices very competitive. Stronger violet diodes capable of imaging photopolymers are now available and this is the area of greatest activity for new consumables.

Photopolymer

Like silver halide plates, high speed photopolymer plates are sensitive to light and in a manual CTP system need a darkroom. Photopolymer plates are very consistent and durable, and can be baked for even longer runs. Their surface content is polymer based and is not vulnerable to undesirable chemical interactions. Photopolymer plates have the added benefits associated with visible light imaging and are particularly popular for newspaper printing. Photopolymer plates cannot support such high resolutions as silver halide and print a narrower tonal range.

Both silver halide and photopolymer plates are exposed using 405 to 670 nm light. No matter how they are imaged they are still subject to their inherent strengths and frailties. Progress is being made to overcome the tonal range and resolution disadvantages of film-speed photopolymer plates, especially using low power violet light. Violet plates are sensitive to shorter wavelength light present in the blue area of the visible spectrum. The short wavelength means the mirrors in the optical system can be very small and so spun extremely fast, for high productivity and precision. More precise imaging produces sharper dots capable of rendering a wider tonal range.

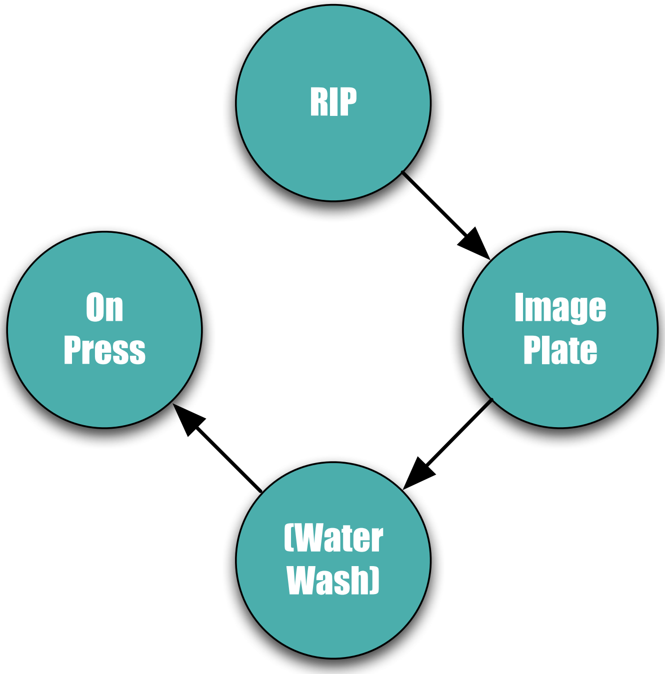
Thermal plates

Thermal plates consist of an electrochemically grained and anodised aluminium base coated with polymers. Once exposed and processed they are extremely hard and thus suitable for long runs when baked. Because most are only sensitive to thermal energy of more than 800 nm these plates can be handled in daylight. Most thermal plates image at a minimum threshold temperature and require some time at that temperature before exposure takes place. Processing is simple and the plates behave like conventional plates on press. Some require preheating prior to processing and baking afterwards in order to achieve really long runs.

On a thermal plate each pixel is individually exposed until it reaches a specific temperature. At that point chemical bonds rearrange to form an image spot. The spots on a thermal plate have straight sides and flat surfaces and can be very small. Thermal plates can support 1 to 99% dots for the widest possible tonal range, and provide impeccable plate image quality, supporting line screens of up to 300 lines per inch and stochastic screening. Thermal plates are popular in commercial CTP environments because they are tough, long lasting, and can be baked for longer runs or used in UV environments.

Processless plates

Processless plates use thermal energy to expose a plate but require no processing and some can be put straight on press. Processless plates save considerable amounts of time, hassle and cost because they don't need processing equipment or chemistry. Processless plates are imaged either with ablation, phase change or wash off technology. Plates that rely on ablation are exposed with a high powered laser that



Processless Computer-To-Plate Imaging

causes the plate surface to burst away from the base. This technique can require some means of debris collection and disposal in devices where dust could settle on the platesetter's mirrors and lenses. This has to be built into the platesetter which can add to the cost of the device. On a wash off plate the laser energy causes the coating to change its solubility. Fount solution washes away the soluble areas on press. Manufacturers are working on several alternative technologies for processless plates.

Plate costs

Plate costs are difficult to identify independent of capital equipment costs and quantity discounts. Prices vary according to the plate volumes purchased, support and maintenance arrangements and even the region where they are sold. Although the price of a digital plate has been substantially higher than its analogue equivalent, prices are coming down. Rising platesetter sales and increased digital plate usage together constitute a growing market, leading to economies of manufacturing scale benefiting individual customers and the market as a whole.

Plate performance and characteristics

Deciding which plate to buy depends on which press the plate is for. Once the format requirements are clear, performance criteria should be identified and quantified according to quality and reliability requirements. Quality measures include such things as screening, resolutions and line screens, and negative or positive working.

Measure performance according to average run lengths for the presses, the range of substrates printed, plate production speed, and platesetter availability. Consider the working environment and space available for a new plate line, and temperature controlled storage of plates (20 to 25 degrees Celsius). Processing issues include equipment and chemistry, cost, chemical storage and disposal, and support especially where deadlines are tight. Support costs should be considered either as part of the plate contract, or on a call-out basis.

What's what?

The major suppliers of digital and analogue plates for commercial printing applications are Agfa, Creo, Fuji and KPG. Plates are also available from a number of other companies mostly offering only one or two products.

Agfa

Agfa has numerous plates but its bestseller is Lithostar Ultra. This visible light silver halide plate is available in several versions according to the user's preferred imaging technology. The Lithostar Ultra-V is used in devices imaging with violet light at 400 nm. Lithostar Ultra-O is sensitive to light from 488 to 532 nm. The Lithostar Ultra-R is for red laser devices imaging at 650 to 680 nm. All three are rated for run lengths of around 350,000 impressions and support resolutions of 1 to 99% at 200 lpi.

Thermostar is Agfa's thermal plate. This positive plate is used in commercial applications of all kinds, especially for 8-up and Very Large Format applications. Thermostar lasts for over 150,000 impressions without baking and over one million if baked. Resolution is 1 to 99% at 200 line screens. These plates require no preheating and there are options for use in external and internal drum devices, the Thermostar P970 (830 nm) and the Thermostar P971 (1064 nm).

The Thermolite processless plate is designed for on press imaging with a suitably designed digital press. This wash off technology is sensitive to IR 830 nm light and uses the dampening water on press to loosen the nonprinting areas of the plate. Thermolite plates last for up to 100,000 impressions.

Azura is a new wash off plate suitable for 100,000 impressions. Based on Thermolite it has an aluminium base coated with small thermoplastic particles that melt together and stick to the base. A gumming process cleans out the non-image areas. Azura is apparently tough, consistent and has a wide latitude on press. The plate can't be baked but it is Agfa's growth path to a truly processless future technology. It is positioned for 2-up and 4-up and lower volume 8-up CTP producing up to 8000 m2 annually.

Agfa also offers the negative working N91 photopolymer plate, mainly for newspaper applications. There is also a violet version of this very popular photopolymer plate, the N91V which is available for commercial applications too.
Agfa recently acquired Lastra and its products for commercial printing. The DiamondPlate LY-8 photopolymer plate is imaged with 532 nm YAG light DiamondPlate LV-1 is a negative photopolymer plate for violet exposure around 410 nm. The DiamondPlate LT-2 is a positive working thermal photopolymer plate imaged with 830 nm IR light. It requires no prebaking. The Diamond 2G is a thermal plate suitable for 100,000 impressions or one million baked.

Creo

Creo has recently entered this arena. The company's first consumables product is the Creo Positive Thermal Plate. The PTP is a positive thermal plate rated for runs of 250,000 without baking.

There are multiple plate manufacturing facilities around the world producing this plate and Creo has acquired plate production plants in South Africa, the Uniited States and China. This gives Creo substantial plate production capacity, and the facilities with which to develop its range of plate products. The PTP is Creo's first plate product to reach market.

Fujifilm

Fujifilm's line of Brillia digital metal plates is used in numerous printing applications and includes thermal and visible light options. There are two thermal plates imaging at 830 nm and three visible light plates in the Brillia line up. There are two versions of the Brillia LP-N3 negative photopolymer plate, responding to either blue argon-ion (488 nm) or green FD-YAG (532 nm) light. Designed for runs up to 200,000 this plate has a resolution of 2 to 98% at 200 lpi. The Brillia LP-NV is a violet sensitive negative working photopolymer plate for commercial applications, Fuji claims lasts for around 200,000 impressions without baking. If baked, the plate can last for up to one million impressions. The plate is rated for 2–98% at up to 200 lpi.

The Brillia LH-PI for longer print runs is a positive thermal plate exposed with an IR Laser (830 nm). The LH-NI is a negative version that can be baked for extremely long runs. The Brillia LH-NN negative plate is a version of this technology for newspapers.

Fujifilm has also announced it is working on a processless plate technology. This phase change plate is rated for 50,000 impressions and Fujifilm describes its performance as acceptable both for on press and off press imaging.

KPG

The KPG Electra Excel is a next generation version of the Electra 830 thermal plate. The Electra 830 thermal positive plate was the first commercial thermal digital plate that did not require preheating. It is positioned for 8- and 4-up applications, along with some heatset web applications and works with lasers in the 800 to 850 nm range. The plate lasts for around 150,000 impressions, but if baked will print over two million. This positive thermal plate can image resolutions from 1-99% at 250 lines per inch. The ThermaNews plate is a thermal technology optimised for newspapers and suitable for runs of 300,000 without baking.

KPG also has the DITP Gold thermal plate which does require preheating. This positive plate supports resolutions of 1-99% at 300 lines per inch and has a dual wavelength capability so in mixed workflows it can also be used as a standard negative plate. The plate is sensitive to 800 to 850 nm light or 380 to 400 nm when used for analogue applications. The DITP Gold is rated for 200,000 impressions rising to over one million if baked.

KPG has developed a processless technology called Thermal Direct. This nonablation plate is compatible with all major platesetter models and can be imaged on or off press. It is rated for runs of 75,000 but KPG have successully printed over 100,000 impressions with it. KPG may also announce a violet material currently in test at a number of sites.

Mitsubishi

Mitsubishi Chemical has a number of photopolymer plates suitable for runs of 100,000. The LV-1 is exposed with violet light, the LA-5 with blue and the LY-5 with green light. Mitsubishi has three thermal plates, the LT-1 for runs of 200,000 and LT-N for 100,000 impressions are imaged at 830 nm. The LT-G is imaged at 1064 nm and is also suitable for runs of 200,000.

Mitsubishi Paper Mills has three plates including the thermal PCP imaged at 830 nm plus two visible light silver halide plates. The Silver Digiplate Alpha is a violet sensitive plate designed for imaging at 400 to 430 nm. The Alpha Red is imaged at 630 to 688 nm. These plates are rated for run lengths of up to 200,000. Mitsubishi also has a processless plate based on thermal principals under development.

Presstek

Apart from OEM plates, Presstek's processless plates are all thermal ablation plates imaged at 800 to 1200 nm. Anthem is suitable for runs of up to 100,000 and requires only a water rinse once imaged. PearlDry plastic plates are used for waterless printing up to 20,000 impressions. The Applause plate is rated for up to 100,000 impressions and doesn't even need a water rinse prior to going on press.

And the rest

There are several other players active in the plate business, with limited product options, such as Asahi which sells a processless 830 nm thermal plate suitable for runs of 50,000. Citidigiplate's Aqua-LHP is a photopolymer UV-violet plate sensitive to 360-450 nm light and Konica has a similar product, the WP8. IBF is a Brazilian company that has two 830 nm thermal plates. The IBF-Million 1 is a negative plate rated for 100,000 impressions or over one million when baked, and the Million 2 is its positive equivalent that requires no preheat. Toray has a negative thermal plate for waterless printing. Imaged with IR 830 nm light the TAC-RG5 is suitable for up to 150,000 impressions and can image resolutions from 1 to 99%. Ipagsa is a small Spanish plate manufacturer that has recently entered the market with a well regarded thermal plate.

Next steps

Investing into CTP starts with understanding the relationship between plates and platesetters. The two are intrinsically linked, and it is impossible to say whether it is plate imaging technology that drives platesetter evolution or vice versa. For the commercial printer investing into CTP plate processing, performance, imaging, and of course cost all shape choice. The market for digital plates is healthy and there are plates to suit every pocket and platesetter. This ought to encourage B2 and B3 printers to make the move into CTP. There is no reason to hold back.

Managing The Workflow

The evolution of workflow management systems is tightly bound up with that of PostScript and PDF. What started with single page output in the early days of PostScript RIPs, today has evolved into a complex multifunctional and often highly automated process. Automation is crucial to direct to plate production management, but it requires careful planning if it is to produce workflow efficiency and not workflow chaos.

In any workflow, the RIP (Raster Image Processor) is the foundation of digital production management. It has to perform three basic tasks. First it has to interpret the PostScript code that makes up the page to find out what goes where, and in what order. Then the RIP needs to render the page elements into the required output resolution. Finally it has to apply a screen to contones and coloured objects, typically photos and illustrations, until everything is turned into high resolution bitmap data. This bitmap data can then be written onto the plate using laser exposure.

Although PostScript is still the foundation of page processing, PDF (Portable Document Format) has become a very popular and practical way to facilitate both page delivery and page processing. Most manufacturers of RIP systems have adopted Adobe's PostScript Extreme technology, which basically converts all incoming files into PDF files. The files are selfcontained, with all fonts and images embedded so that they can be individually processed and imposed ready for output. In a modern RIP server equipped with multiple and high speed processors, this type of page processing is very fast.

Modular systems

At a quick glance the RIP process may look fairly simple, but there are in fact several subprocesses involved. In a CTP workflow electronic impositioning of individual pages is required and the RIP will probably have to process trapping data. Final colour management as well as various types of proofing could also be required. A comprehensive RIP system will therefore often consist of a whole range of software modules, that execute different tasks. In many cases these modules can be added to an existing workflow as the need arises. Starting off with a fairly simple and less expensive RIP system is an attractive option for many buyers. Such a strategy allows the workflow to become more sophisticated over time, as production staff's experience and knowledge grow. For example a very basic impositioning function will be fine when first working with a fully digital workflow but as experience with computer-to-plate production evolves, the volume and type of work might call for more advanced functionality such as step-and-repeat, integrated preflighting and colour management.

Automation and job tickets

One of the most important aspects of digital workflow management is of course throughput capacity. To be able to handle incoming jobs with as little human intervention as possible, most RIP and workflow systems have introduced a job ticketing function. Job tickets share a common purpose but how the technology actually operates can vary quite a bit from vendor to vendor. Sometimes job tickets are described as pipelines through which pages are sent for automated and streamlined processing. Adobe offers a basic technology for these job tickets called PJTF (Portable Job Ticket Format), but most vendors have had to add quite a lot of their own technology to really make PJTF work in the RIP and workflow system. The new Job Definition Format (JDF) incorporates much of the same technology and is becoming a more coherent standard for job ticketing (see more about JDF in the Buyer's Guide to JDF). In the meantime it is important that a workflow system has easy to use and efficient functions to automate the various production processes. With job tickets and process automation, the setup of a new job can be very fast, since it can be based on preset templates designed for common workflow scenarios.

A common output format – bitmap TIFF

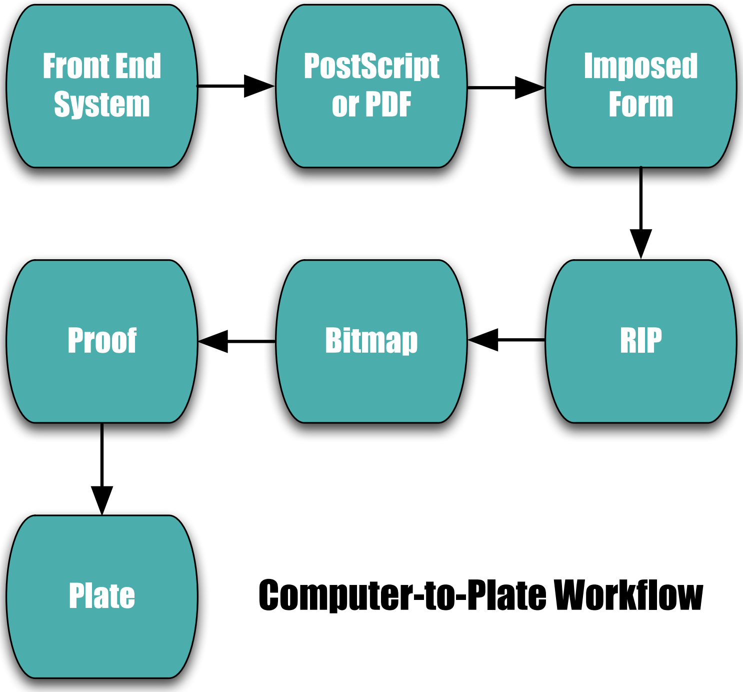
In applications where there are multiple output devices or destinations for production files, it is important that the workflow system can save raster image processed data as a high resolution bitmap. Often this storage format will be a version of TIFF (Tagged Image File Format). TIFF is very useful because it can be output on different output engines from different vendors. Instead of requiring the device and workflow system to come from the same vendor, correctly handled high resolution bitmap data can be transferred to the actual output engine, without needing to reRIP it. TIFF is also useful if one has to deliver ready-to-expose files for output at remote locations. And TIFF data can be used as the basis for different proof outputs.

Infrastructure for workflow management

One of the key elements for an efficient workflow is the digital infrastructure underpinning it. This includes the network, servers and so on. Going direct to plate means that everything is digital, managed, transferred and stored via the network and the servers. Short access times to the server and high speed over the network requires high capacity, power and bandwidth. Too often printers have bought a brand new CTP device only to find that after a few weeks the server and network is choking on the increased traffic and workload. When the platesetter supplier recommends additional computing and networking power, listen to what they tell you! Suppliers understand how to estimate the bandwidth and storage capacity needs for getting the best productivity out of the technology. Take advantage of their knowledge and experience!

By its very nature direct to plate output demands a digital proofing solution, since it does away with the films from which conventional hard copy proofs are made. Proofing has to be incorporated in a CTP workflow and fortunately there is a whole range of digital proofing solutions to chose from. They vary in price and capacity, but for screen accurate proofs the options include a handful of devices such as KPG's Approval or DuPont's Digital Chromalin. Colour accurate proofing engines are available in almost overwhelming numbers. For imposition proofs and layout proofs where colour accuracy isn't crucial, there are even more systems to choose among.

Computer-to-plate production also demands that all page content is in digital form, however repro films might still be a factor even in a CTP workflow. Legacy material, such as old images or ads, might have to be integrated in an all digital workflow. The only way to do this is by scanning the film originals dot for dot, using a dedicated copydot scanner, or a contone device with copydot functionality. These technologies digitise repro films so that they can be incorporated into the digital workflow. The scanner needs to be able to capture data at high speed and at high resolutions, and should have dedicated copydot processing software. There are several solutions on the market for this type of scanning, but obviously it is better to avoid having filmbased originals in the first place. Teaching customers how to provide documents as PDF files is the obvious way to go.



An all digital CTP workflow often changes the way things are done, both for the print buyer and for the printer. Training of staff and finding new ways of how to use the resources should not be neglected. Typically CTP workflows require fewer people in the repro department since no manual stripping is done. All digital workflows need new organisation and methods for controlling incoming material effectively and providing customers with good support. A check-in point for incoming files is vital in prepress and this often involves interacting with customers. Understanding PDF preparation and preflighting technology can also make a big difference to efficiency, but it can take time for operators to really get to grips with both. Training in the initial stages of a CTP implementation can save considerable costs further down the line when things go awry in live production.

Future expansions

Once a truly digital workflow is set up and prepress production is optimised, it's time to look at the processes before and after prepress. For several years the CIP3 (Cooperation for Integrated Prepress, Press and Postpress) data format has provided the means to automate set-up for printing and binding equipment. JDF is the successor to the CIP3 format so the organisation extended its remit and became the Cooperation for Integrated Prepress, Press, Postpress, and Processing or CIP4. The contribution JDF will make to digital workflows will be huge. Any company investing into CTP technology should ensure that they invest in a JDF compliant workflow as well as the hardware. Efficient front end technologies are the only way to truly get the most out of a CTP investment. Everything in life comes down to workflow management and CTP is no different. Remember, it's not what you do it's the way that you do it!

Laserscan Case Study

Company:

Laserscan, Lytham, Lancashire, UK

Type of work:

A repro house with a variety of customers in need of high quality colour work, ad agencies as well as direct customers. End products are plates, film and the occasional Outline PDF file ready for output on a CTP.

Equipment:

Screen PlateRite 4300 thermal CTP (with Fujifilm Brillia LH-PI positive thermal plates), with a Screen Trueflow digital workflow (with Screen Spekta hybrid screening as an option).

Time of installation:

September 2003

Top advice:

"Do not buy your digital workflow at the same time as the platesetter – the transition to CTP should be problem free as long as you have previous filmsetting experience." – Alan Broomhead, Partner.

Lancashire repro house Laserscan has been running their Screen PlateRite thermal computer-to-plate since October 2003. About a year earlier Laserscan upgraded their Screen Taiga workflow to Screen's Trueflow system. With the purchase of the CTP a second Trueflow was installed.

"The decision to invest in a CTP was definitely customer driven", says Alan Broomhead, who runs Laserscan with partner Alan Fairhurst. "More and more of the printers we work with were putting in CTPs and did not want us to supply films anymore. Also a couple of our major customers put in brand new presses with automatic plate mounting, which meant they did not want conventional plates which had been punched manually, they wanted the register accuracy you get with CTP and inline punching."

So the decision to invest was made in order to keep the business moving forward. But as Broomhead points out although it was definitely the right one, it was also a tough one: "You don't buy just a platesetter. You also need a processor and perhaps an autoloader, which costs more than some small platesetters – we decided not to get one. And of course you have to have the front-end RIP and workstation to drive it, which can cost nearly as much as the platesetter if you want to drive a large amount of work."

Laserscan decided to use Fujifilm plates, which they buy directly, and their processor is also from Fuji. During the time when Laserscan was looking into what system to buy, several suppliers offered them deals for a combination of platesetter and plates and some did the same for the processor and plates, but Laserscan decided not to go down that route:

"You end up paying somewhere", says Alan Fairhurst. "So we decided we might as well buy the equipment and then get the plates as competitively as we could. We estimated how many plates we would use in a year, and calculated that in the end we would pay a lot more if we had gone for a combined deal. Also, we wanted to base our decision purely on quality to get the best platesetter, the best plates, the best workflow. Once you enter a deal you're to some extent controlled by the supplier."

Alan Broomhead of Laserscan

Since Laserscan supplies plates to a number of printers, one of the features that they were looking for in a CTP system was flexibility in punching. In the case of the PlateRite it is automatically adjustable, and Laserscan has it set for Heidelberg and Komori presses in A2 and B2 (maximum size) formats, which are the two basic types. Mitsubishi uses the same standard as Heidelberg in their presses. In the main, Laserscan outputs 3–4 different plate sizes. Alan Broomhead explains why the automatic punching is so important: "To give you an example, we have one competitor, a printer, who has an older platesetter which punches offline. We can sell plates at the same price, but we have a state of the art platesetter which punches online. It's also thermal and the dot accuracy combined with the register accuracy, thanks to the automatic punching, gives us a quality advantage."

Laserscan never really considered buying a visible light CTP, as Broomhead explains: "Thermal has two main advantages, as we see it. Firstly, it produces the highest quality plates from a dot reproduction point of view, which of course is crucial for us in supplying repro work of the highest quality. Also thermal CTPs are daylight operated, which meant we could put it in the middle of our main room without needing to organise a yellow or red light darkroom."

Another factor in choosing thermal was the possibility of producing plates with stochastic screening, or, in this case, Laserscan's newly acquired Spekta hybrid screening from Screen. Says Fairhurst: "We haven't really started using it on a larger scale, but we have one customer who prints fabrics, which frequently causes problems with moiré, so we thought they could benefit from it. It has worked well in the test runs we have done. And, of course, thermal CTP was a necessity in order to produce these plates."

Both Broomhead and Fairhurst stress the importance of the workflow and RIP in order to take full advantage of the CTP. Says Broomhead: "With a high-end workflow you get not only speed, but also tremendous flexibility, in that the RIP can handle all sorts of file formats. We've been sent jobs that others have not been able to process, and we've managed to output them. But the most important advantage is that we get data integrity throughout the workflow, because the system uses the ROOM (RIP Once Output Many) concept. This means that once a job is RIPped in the system, it remains exactly the same whether it is output to disc, plate, film, proofer or as an Outline PDF. This is so crucial, particularly for a stand alone repro house like ourselves, with customers all over the country and considerable costs involved in any reprints due to RIPping inconsistencies."

Laserscan uses an Epson 1000 inkjet printer to output digital proofs, which are now used for all but one customer. "We use our ColorArt film based proofer for one film customer for whom it is vital that any moiré patterns are discovered, which of course you can't totally guarantee with a digital proof," says Broomhead. "But thanks to the data integrity of our workflow, digital proofs are good enough for the vast majority of customers and jobs. This is something which has improved beyond recognition over the last two or three years. It's still not perfect, but to get a really perfect proof, you have to run it on the press anyway."

Laserscan had predicted producing about 600 plates a month on the CTP system, but current throughput runs at over 1000. They estimate that about 70 percent of their work results in plates, less than five percent in PDFs (for printers with CTPs of their own), and the rest ends up on film. "A lot of the printers are kicking out their plate making equipment and have bought CTPs of their own. Consequently they don't want us to supply film anymore; they can't turn these into plates," says Broomhead. "So now we send them Outline PDFs instead, and I suspect that might increase a little bit, although of course we'd prefer to supply them with plates. Over time that might happen."

Alan Broomhead brings up two additional points to bear in mind when considering a CTP system. The first is that the chemistry is not as stable as it is in a filmsetter, it is more sensitive. Laserscan changes the chemistry and cleans the processor every two weeks. The other point is that, whereas the filmsetter is frequently left to run overnight, the CTP requires a degree of operator supervision, unless you get an autoloader: "We can programme the filmsetter to run rolls of films overnight in all different formats. With the CTP we'd have to have a multi-autoloader in order to pre-programme several formats and of course remove the paper sheets between the plates. We would still be apprehensive about leaving it running overnight; the metal crashing doesn't bear thinking about."

Laserscan is happy with the transition to CTP, which has gone smoothly thanks to the digital workflow already being in place and the skill and experience of the workforce. And any worries about supplying a new product – plates – to customers are gone: “We thought we might have problems with plates getting scratched and that we’d have to replace a lot, but of the 4500 we’ve run so far, we’ve only had one scratched. And we’ve not had a single print failure – i.e. no returned plates from any printer.”

GraphX Case Study

Company:

GraphX, Copenhagen, Denmark

Type of work:

A web offset printer producing high quality colour work, from flyers to product catalogues.

Equipment:

Creo Prinergy digital workflow and Staccato stochastic screening
Two Creo Thermal platesetter 3244 and one Creo Trendsetter VLF, all with Squarespot technology. Four web offset presses, one sheet fed.

Time of installation:

First photopolymer CTP installed in 1997, shift to thermal technology in 2000. Introduction of Staccato in 2001.

Top advice:

"It is important that you solve any stochastic screening issues at the printer's. In other words, when you start using stochastic screening in production, make sure the internal processes have been adjusted accordingly – do not involve customers in these changes."

– Søren Henriksen, CEO, GraphX

With four web offset presses and a sheetfed press, GraphX is one of Denmark's largest commercial printers. In 2000 the company switched from photopolymer based CTP to thermal technology and a year later introduced Staccato stochastic screening. In addition to allowing GraphX to produce higher quality images, the introduction of stochastic screening has also resulted in more consistent colour on press and reduced ink consumption.

GraphX installed its digital workflow and the first CTP back in 1997. At the time, many GraphX customers were becoming increasingly aware of prepress issues, and the company saw a completely digital workflow as a natural step. As it turned out, it was the workflow rather than the CTP that turned out to be the clincher in reaching an investment decision.

"We went to visit Creo in Brussels," says production manager Søren Henriksen. "It became clear that at that point, Creo was quite far ahead of the competition on the workflow side. Their system was better integrated and had better functionality. We were particularly interested in the database and the ability to track jobs all the way through the processes."

The subsequent switch to thermal CTP was made because the photopolymer plates were limited in resolution, producing a maximum of 150 lpi screens. "With the

Squarespot technology and thermal imaging we can reach 300–400 lpi, and with Staccato we're producing 20–50 micron dots, depending on the job", says Henriksen. "It also saves us waste in the press start-ups. Because there is less water on the plate, ink-water balance can be reached more quickly."

GraphX prints prestigious Danish hifi supplier Bang & Olufsen's product catalogues, and in 2001 the customer specifically asked for the subsequent year's edition to be printed using stochastic screening. GraphX obliged, and spent considerable time and money in implementing the new technology. Says Søren Henriksen: "As we were installing Staccato and adjusting our workflow and processes, we gradually came to realise that not many Scandinavian web offset printers use stochastic screening – it looked like it could become a major competitive advantage."

Søren Henriksen, CEO, GraphX

GraphX had worked hard on process control ever since the initial CTP and digital workflow installation in 1997. According to Henriksen, with the introduction of stochastic screening the control was further enhanced. One area of improvement was colour consistency in the press. Søren Henriksen explains:

"Web offset has more variables than sheetfed offset, not least the speed – we print at up to 15 metres per second – we print on both sides of the paper simultaneously, on poorer quality paper etc. It is not unusual that we are required to produce the highest quality full colour print on 52 gsm stocks. The consistency in the chemistry is also different than in sheetfed. Let's say the magenta density increases by 5 percent over a long web offset run. With a conventional screen you'd get a very definite red colour cast. With an FM screen the increase is much less noticeable."

More surprising than the improved colour consistency is perhaps that the use of stochastic screens has reduced ink consumption at GraphX. "I'm no engineer, and I cannot explain precisely why it happens," says Henriksen. "But we do have ink measuring devices on all printing towers, and consumption is definitely down. As a matter of fact, we can produce the same density in AM and FM – which we can measure on a control strip – and still use less ink in FM. And, incredibly, we get better contrast despite using less ink."

GraphX customers all send in print ready PDF files and proofs produced on a digital proofing device. GraphX RIPs the files and outputs them on the CTP.

A Word on Stochastic Screens

Stochastic screens do not behave like conventional ones in print. A basic difference is the increased dot gain: stochastic screens increase it. This can lead to a more consistent printing process, but equally it means you have to compensate for the dot gain in prepress. All the users we have talked to mention the dot gain as a major factor in adjusting production to implement stochastic screening. Everyone agrees that once the compensation is figured into the prepress process, the technology works very well. The increased printing consistency has two sides, according to the printers. As long as your prepress is in order, it is a positive thing because it means there is less need for adjustments in the press. However, a couple of users point out that with FM you are unable to adjust the colour on press the way you can when printing AM screens.

So why do FM screens lead to a more consistent printing process? Basically any fluctuations in the inking affect an FM screen less than they do an AM screen. The reason for this is that the dot diameter is smaller which means that the ink threads that are pulled between plate and blanket are thinner and hence break closer to the printed image. This, in turn, leads to a more even, and thinner, layer of ink. This would explain why GraphX have been able to reduce their ink consumption since introducing stochastic screening.

"It is important that you solve any stochastic screening issues at the printer's," says Henriksen. "In other words, when you start using stochastic screening in production, make sure the internal processes have been adjusted accordingly – do not involve customers in these changes. All our customers need to know is that they should always produce their proofs with 12–14% dot gain in the 40% dot. In addition we give them information about the maximum colour values – percentages of cyan, magenta yellow and black put together – for each paper quality. We then perform the necessary calibration of the CTP."

Since beginning to use stochastic screening for many of its jobs, GraphX has been able to cut ink consumption by about 10%, and of course produce better quality print. But there are downsides as well, according to Søren Henriksen:

“Because stochastic screens use smaller dots, the plates wear quicker. This is because the smaller dots cannot hold as much water. As a consequence, we often use 50 micron dots rather than the smaller ones to compensate.” According to Søren Henriksen, 70 micron dots are the equivalent of printing with traditional screens in that with 70 micron dots, colour can be adjusted on press, which is not possible with the 20–25 micron dots. (See box)

Since going thermal GraphX has used KPG Electra plates, although the company has tried other plates as well. “We are happy with the Electra and are very cautious about trying anything else – although we are constantly getting offers. The reason we’re cautious is that some other plates have proved less durable, which is a major concern for us. We print on numerous different paper qualities, which demands more of the printing plate as far as durability is concerned. We also need a plate which can go in both the web offset presses and in the sheetfed, and we know the Electra works.”

There are certainly issues to take into account when considering producing print with stochastic screens, but all in all the new technology has proved a competitive advantage for GraphX, and could do so for any printer with good process control.

Computer-to-Plate & Proofing

With investment into CTP comes the need for new approaches to proofing. With CTP there will no longer be any films from which to make conventional (analogue) proofs. Digital proofing is the only option. There is a huge range of digital proofers available and they meet a huge range of different demands and expectations. Probably the simplest option is to use the same device for making proofs as for making plates. The Creo Lotem engines can image proofing materials, as can the Creo Trendsetters. But these are the exception rather than the rule.

Digital proofing considerations

There are some basic considerations to be made before deciding what proofing device to buy as part of a direct to plate workflow. Perhaps the first decision to make is whether you consider it absolutely necessary to obtain the exact same screen dot on the proof as in the final print. This may sound trivial since all analogue proofing systems have this ability, but when it comes to a digital proofer things aren't so straightforward. The digital proofer may not work at the same resolution as the platesetter, and probably cannot create the same screen dot, at the same screen ruling. And even if the proofer does by chance operate at the same resolution as the output device, it probably uses a different exposure technology. This means it will probably use a different screening technology than the engine and so will produce a different screen ruling and dot shape. And it gets worse.

One of the main reasons for insisting that the proofing device has the same screen appearance as the platesetter is that this is the only way to reveal the possible existence of moiré in the images. When and if moiré appears depends very much on the screen ruling used and the screen angles chosen for the cyan, magenta, yellow and black separations. If you are concerned about moiré, you should narrow the search and only look at systems that offer a true screen proof, or dot proof. Agfa, Best, Compose, Fujifilm and KPG are among the vendors of such systems.

Advances in technology have meant many printers have found that moiré is more or less a thing of the past, especially if they regularly use FM (stochastic) screening. If moiré isn't an issue, it's more important to achieve a colour accurate proof. For this there are more output options available than there are for true screened proofs. Even so it's not just a matter of finding a colour printer with enough resolution and the right output format. The quality of the proof from a particular printer depends very much on the raster image processor (RIP) used at the front end. Normally the printer driver supplied by the printer manufacturer is too basic for more challenging applications. It won't do at all for high end graphic arts production. The RIP needs to support both PostScript and the ICC profiles for accurate colour management (there is a more in depth explanation of proofing technologies and colour management in the Buyers Guide to Colour Management & Proofing). This requirement pares down the list of options yet further.

For modern colour management the ICC standards are generally accepted as the dominant technology. The International Colour Consortium (www.color.org) recommends a workflow in which colours are defined in a device independent colour space, and then characterised according to how different devices in the workflow handle colour. Any proofer for a CTP workflow should support ICC profiles, which capture the device's characteristics so that colour conversions are accurate. One of the most useful applications is the ability to simulate the colour output from a printing press on a colour proofer.

Softproofing & remote production

In many situations soft proofing might be required so that customers and operators can see colour accurate proofs on their monitors, all of which are of course carefully calibrated. In an all digital workflow softproofing can be very useful,saving time and courier costs, particularly in distributed production situations.

Working in a digital environment creates new proofing pressures, particularly when working with customers at remote locations. A remote proofing solution is vital, particularly in applications where time is short. Ideally the same kind of proofing device should reside with the designers and document creators, as with the printer. The system needs to ensure that the local proof looks exactly the same as the proof at the remote site. Perhaps the best known name for this type of proofing is KPG which recently acquired Real Time Image, specialists in remote proofing. The company is building an interface between Virtual Matchprint and Real Time Proof in order to introduce remote proofing for a wider range of production models, including remote CTP.

Some systems have started to use the Job Definition Format (JDF) for the transfer of colour information which will help to ensure that the output from two proofers in different locations present the same result. All necessary reference data can be stored in a file and sent to the remote location. Best and Gretag Macbeth provide such solutions, as does KPG. Whether it's a remote or local proofing engine they should all be measured with some kind of measuring device to check the accuracy of the proof.

Imposition proofs

In addition to screen accurate and colour accurate proofs many printers will need to consider full size imposition proofs, particularly if they are producing large format plates. Imposition proofs might not need to be absolutely colour accurate, so often a black and white print will do. Many large format colour proofers are on the market and some, such as the Agfa Sherpa, are available with a duplex function. This can save a lot of time and cost and simplifies the creation of dummies.

Finally there is the consideration of whether a proof needs to be made on the very same paper stock as the print run will be printed on. Not all proofers can use the actual paper stock. If this is important, put it high on the list and run tests before you make a decision!

Proofing devices

Almost any colour printer can be used for proofing. But what makes a particular printer qualify as a high end colour proofer is whether it has the colour accuracy, resolution and predictability needed to consistently and reliably represent what will appear on press. If a colour printer is unstable, it cannot be used for contract proofs.

If we decide to look for a top of the line screen proof most of the available systems use a high end version of dye sublimation technology. The image is exposed onto some type of substrate that is subsequently transferred to the paper stock. KPG's Approval is one of the best known dedicated proofing systems in this class. It supports pretty much any high quality proofing output including special inks and metallics.

Some halftone proofers are based on inkjet technology, coupled with dedicated RIP software to assure the reproduction of the halftone dots. Creo's Iris technology set the standard for this type of application and Creo is continuing to develop new inkjet proofing technologies. Often this type of proofing system uses the same RIPped high resolution bitmap data as the platesetter.

The largest group of proofing systems is based on inkjet technology. The same device can be operated by different RIP systems, with different functionality and quality levels. For CTP appplications however it is important to invest in stable, consistent and reliable proofing engines. There are plenty of cheap engines on the market that can be used for proofing, but be prepared to pay for specialised data and colour management knowledge. There are many companies active in this market, but Agfa, Creo, EFI and KPG are among the best known names.

Colour laser printers are also attractive as digital proofers, but the main concern is colour accuracy and repetability. While colour laser printers are often fast and easy to operate, not all of them stand up to the very high demands of colour accuracy. Agfa, Best (EFI), KPG and Compose are among the most well known vendors of dot-proof solutions.

Colour management

To judge whether a colour proofer meets expectations one needs to know the printing standard the proofs should match be that SWOP, Euroscale or something else. SWOP (Standard Web Offset Printing) is one of the most widely used ink standards and several proofers are SWOP certified for example products from Best, Canon, Creo, Dupont, GMG, HP, KPG and Oris (www.swop.org). Another standard is the Pantone Matching System, and Pantone also has a certification procedure. However, unlike SWOP and Euroscale where the user can find out the tolerances for themselves, the Pantone Matching System is not an open standard. The actual colour values for the different Pantone colours are not available.

SWOP and Euroscale are ISO standards, and can be verified in many ways. The actual ISO standard is available at www.iso.ch and also through the American National Standards Institute, www.ansi.org. For help on how to meet the relevant standards in your press and so in your CTP proofing workflow, there are organisations like GATF (Graphic Art Technology Foundations, www.gatf.org) and NPES (www.npes.org) in the US. In Europe organisations like Fogra (www.fogra.de) and Ugra (www.ugra.ch), provide tools and training on how to achive high print quality.

Advances in CTP

CTP is mature. Of this there can be no question. However with maturity comes experience and with CTP that experience translates into a bevy of new options and alternatives. Both plates and engines continue to advance at a steady pace. The following overview of the highlights in new CTP technologies shows just how far this technology has come.

Engines

Agfa's Galileo and Palladio platesetters are now available with 30 mW violet diodes. Both devices will image the new N91V violet photopolymer plate now positioned for both commercial and newspaper applications, as well as the Lithostar silver based plate. The 5 mW violet diode Palladio is also to be available as a manual device, imaging seventeen plates per hour (pph).

Xcalibur VLF XXT and Xcalibur 45 XXT are new versions of Agfa's large format platesetters. Both are based on Agfa's GLV technology and will be available at the end of the year. For newspapers Agfa is introducing two new violet imagers. The Advantage CL and CLS models image 160 and 220 pph at 1016 dpi respectively.

The new Acento is a 4-up engine OEM'd from Screen. It images the new Azura chemistry free plate and is a fully automated thermal engine available in several configurations. Productivity ranges from 10 to 20 pph and there are several plate loading options.

Creo's new Magnus VLF engine is claimed to be the fastest automated VLF device on the market. It has a larger drum (1600 x 2108 mm) than the Trendsetter and images 15 2050 x 1510 mm plates per hour at 2400 dpi. The Magnus VLF engines is a complete redesign for greater productivity, with a larger format, a slightly smaller footprint, improved plate handling options and different levels of automation. It has its origins in the Trendsetter VLF but it is a major platform change for Creo. The Magnus has higher powered heads, dual plate loading, faster electronics, and portrait plate registration and imaging. The Magnus images at one metre per minute at 2400 dpi.

There are three modular and upgradeable models. The Magnus VLF continuous load adds stacked load and unload tables, and a multicassette unit increases plate capacity to 75 plates.

The new Lotem 200K for the 2-up market is a semi automatic external drum thermal platesetter. It images roughly 12 plates per hour at 2400 or 2540 dpi. This platesetter is incorporated with the KBA Genius 52 waterless sheetfed offset press as part of a complete production system. It has also been qualified to expose waterless chemical-free plates.

ECRM has a new 8-up version of the Mako violet platesetter for imaging plates 824 x 1050 mm. There is also a new automatic version of the Mako 4. The device will image 25 pph at 2540 dpi up to 635 x 927 mm. For newspapers ECRM is introducing the Newsmatic CTP, an automated platesetter based on the Mako and available for imaging either violet photopolymer or silver halide plates. The entry point for these machines is €49,000.

Esko-Graphics is getting into the entry level market with the new PlateDrive Compact, manufactured by Highwater Designs. This 4-up engine is an internal drum violet laser device that images 20 pph at 2540 dpi. It costs less than €70,0000, including the FlowDrive 4 digital front end.

Further up the scale is the new PlateDriver 6 Semi that outputs 680 x 930 mm plates at 1200, 1270, 1800, 2400, 2540 and 3000 dpi. It can image 24 pph at 2540 dpi and is a semi autoloading machine, loading two plates with auto unloading and processing. It has 5 to 12 punch options, depending on the configuration and a fully automatic version is available. The PlateDriver 6 Automatic has five plate trays for holding up to 100 plates each. These engines can be upgraded for higher speed to image 32 pph at 2540 dpi. They can also be configured for 8-up output and with more punch tools.

The DPX 4 CTP for polyester plate imaging was shown at Igas and replaces the DotMate 7500. The DPX 4 images 680 x 750 mm plates at 1200 to 3000 dpi imaging 27 pph at 2540 dpi. It costs less than €60,000. Esko-Graphics also has a new 4-up device for imaging conventional UV plates, based on its own Dicon technology and called Espresso.

Fujifilm plans to introduce a new 4-up violet photopolymer platesetter based on the company's existing head. Available as a manual, semi or fully automatic device, the new platesetter has an internal punch and supports up to eight resolutions. It has a single 120 plate cassette and is supplied with an entry level Adobe RIP. Output is 35 plates per hour at 1200 dpi or 20 pph at 2400 dpi. Pricing has not yet been announced.

Highwater is an innovative UK developer which has recently signed a deal with Esko-Graphics to supply it with the foundation technology for the PlateDrive Compact. Highwater's Python is to be available with a 60 mW violet laser and as a semiautomatic device. This internal drum engine images 2-and 4-up impositions, imaging a B2 plate in less than two minutes at 2540 dpi. It can support screen rulings of up to 200 lpi.

PrePress, part of the IPA/alfaQuest group has been shipping violet imaging machines with 30 mW diodes for a couple of years now and is introducing 60 mW diodes this year. The company continues to develop its FasTRAK range with particular emphasis on the high power UV (imaging conventional plates) and violet laser diode models.

KPG is working on a new thermal 512 channel dual head suited to on or off press imaging. The technology derives from the work KPG did on the Newsetter platesetter used in both commercial and newspaper devices. KPG is increasing its activities in the commercial workflow management and platesetting sector, and details on this are expected soon.

Lüscher is introducing a new flatbed VLF device that uses UV cured inks that can print onto flexible or rigid substrates up to 80 mm thick. The platesetter images 3050 x 3500 mm plates. Lüscher is also extending its Xpose line with the 190 model. This thermal engine is a 1560 x 2060 mm device for imaging 32-up impositions. It is also suitable for KBA's new Rapida 205 super large format press. Lüscher claim the Xpose 160 with 128 diodes is the fastest manual device available. Over 500 XPose engines have been installed since the device's launch at Drupa 2000. Lüscher has recently entered the flexo market through its acquisition of ZED Instruments and the company's own flexo developments.

Screen has a number of new automated engines coming. This includes a 30 mW violet version of the B3 PlateRite Micra engine imaging 23 pph at 2400 dpi. Screen is also introducing what it claims is the fastest sixteen page device today, the PlateRite Ultima 16000. Based on a 512 channel GLV thermal head it is a multiformat system able to handle plates from 4-up 650 x 550 mm up to 16-up 1470 x 1165 mm. Available as either a semiautomatic or automatic device it can image 28 plates per hour at 2400 dpi. It has inline punching and can have up to 400 plates online.

The new PlateRite Ultima 32000Z provides what Screen describe as "turbo-powered" plate production and features twin plate feeding pioneered by Screen. The 32000Z outputs plate sizes from B2 up to the 32 page plates (2,124 x 1,276 mm) and has selectable imaging resolutions up 2,540 dpi. This engine can output 46 1,030 x 800 mm plates per hour at 2,400 dpi.

Strobbe is starting to raise its profile as a supplier of devices to end users. The company has over 600 CTP engines installed under the Agfa name. The new 8-up PS 36 images any plate size to a maximum of 850 x 1050 mm. This flatbed device has either green or violet laser based optics and is available as either a manual or semi automatic engine. There are seven selectable resolutions, from 800 to 2540 dpi.

Strobbe's PSA 33MV is a highly flexible engine for anything from 2-up to 8-up output, with a maximum output size of 850 x 1050 mm. This automated platesetter can be configured in all sorts of ways depending on performance needs. It can have one to ten plate cassettes for up to 20 plate sizes online at a time and is available with either a 530 nm FD YAG or 405 nm violet laser for imaging silver or photopolymer plates at 800 to 2540 dpi. The PSA 33MV outputs 25 pph at 2540 dpi and is expected to cost around €200,000.

Plate highlights

Agfa's Azura is a wash off plate suitable for 100,000 impressions. Based on Thermolite, this chemistry-free plate has an aluminium base coated with small thermoplastic particles that melt together and stick to the base. A gumming process cleans out the nonimaging areas and Azura is apparently tough, consistent with a wide latitude on press.

Creo's PTP is gaining considerable attention with a rising number of users. The company's entry into plate manufacturing has seen Creo acquire plants in South Africa, the United States and China, and a number of new product announcements are expected this year. The company has already introduced Fortis PN for newspapers and Mirus PN for commercial and packaging.

Fujifilm is developing a new processless phase change plate imaged at 150 millijoules per square centimenter versus the 100 mj per square centimeter of Fujiflm's LH-PI plate. The new plate can be imaged on or off press, although different technologies are involved, and is rated for runs of 50,000. In tests the new plate has given acceptable printability and on-press developability. Fujifilm is also developing more CTP plates for UV applications.

KPG's new thermal non-process plate is called Thermal Direct. It is designed to provide lower material costs, reduced work and faster processing. Thermal Direct is compatible with all major platesetters, and is imageable on and off press. The plate has no need for debris handling and supports run lengths of 75,000 although KPG has achieved over 100,000 in tests for newspapers. The plate will hold a 20 micron dot but 10 microns have been achieved in the lab. KPG is also working on a new flexo plate for packaging and continues to assess violet technologies.