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## The Guide to...

# CTP

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Digital Dots Technology Guides

# The Guide to CTP

## *Second Edition*

Digital Dots
Technology
Guides

## The Digital Dots Technology Guides

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

Authors Laurel Brunner, Cecilia Campbell and Paul Lindström can be reached via the Digital Dots website (www.digitaldots.org).

## About Digital Dots

Digital Dots is an independent graphic arts research and content development company established in 1999. The company is a collection of like-minded graphic arts consultants, pixies and professional journalists specialising in digital print production and publishing technologies. Digital Dots provides exclusive market research and content based on its own testing and evaluation services for prepress and publishing applications. It also publishes Spindrift, the industry's only independent journal for graphic arts news, analysis and comment.

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# Introduction

**Welcome to the Technology Guide to CTP**

Computer-to-plate output is a reality for many printers, but for many more it is not. However the number of printer and prepress companies planning investment into CTP has never been greater. Some of these are new to the technology and many are replacing first and second generation technologies with new machines. The current generation of platesetters offers phenomenal speed, flexibility and automation options. With so much to choose from, making the right investment decision isn't easy, particularly for first time buyers. That is what this Technology Guide to CTP is all about. It helps printers, prepress professionals and their customers to understand CTP production technology and how it helps improve the business's production capacity.

The following pages cover everything you need to know about digital metal platesetting, from basic CTP technology concepts to digital plate imaging and plate technologies. Consumables are central to the CTP investment proposition and processless platesetting is gaining credence throughout the market. We explain how processless plates work, and why this technology is relevant for many applications.

Successful investment is about choosing the right technology for your business. However it is also about getting the service and support arrangements to suit your business. Cost of ownership, investment protection, adaptability for changing production needs, all these need consideration alongside the technology. This Technology Guide to CTP gives you the background to understand how to turn technological complexities into sane and relevant information. We hope you find this publication useful and welcome your feedback.

# Getting into Computer-to-Plate Production

**Although we hear a tremendous lot of noise about computer to plate (CTP) production, it is still by no means the predominant output choice throughout the worldwide printing industry. Most printers held back because they were reluctant to change their workflow, or because they feared they wouldn't be able to make the platesetter pay its way. Efficient CTP demands a fully digital workflow, so customers needed to be willing and able to deliver accurate digital data, ready for direct output. If they could not, the printer had to take responsibility for this work, so for many printing companies, digital file delivery and management were the main barriers to investment in CTP. That is no longer the case; now most printers in developed markets such as Western Europe and the US, have made the move to CTP, and are considering next generation investments. Digital production has spread throughout all sectors of the media industry, so transitioning the workflow is not the problem it once was. This is why the CTP market continues to grow, for both new users and companies purchasing replacement systems.**

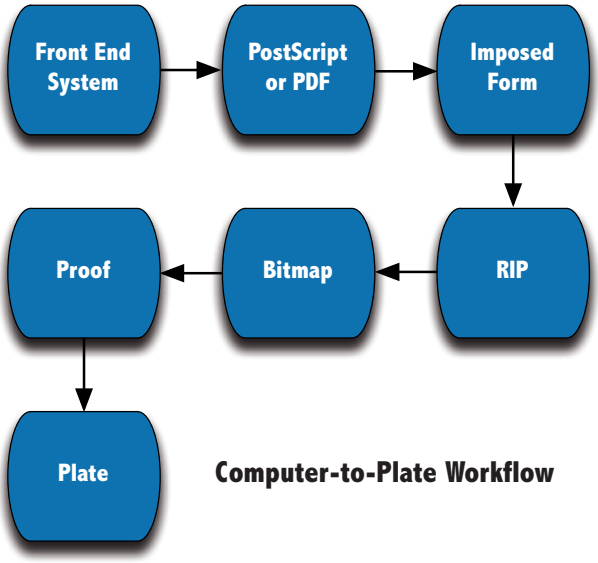
## The State of the CTP Nation

CTP technologies are stable, mature and proven in all sectors of the printing industry and there are plenty of digital plates, including processless plates, to choose from. For some printers planning the move to CTP, the choice can be as much about going processless or not, as it is about the imaging technology. Processless imaging is the next logical step for platesetting, removing another set of sometimes troublesome and costly variables.

The arguments for going processless are compelling and plenty of printers haven taken the processless plunge. Agfa has around 600 users of its Azura chemistry free plate, Kodak won't say how many it has for Thermal Direct, and Fuji, which is unique in that it offers both thermal and violet imaging processless plates, has an unspecified number of users.

The arguments for going to CTP are well proven, whether the platesetter images processless plates or not. Printers benefit from faster turnaround, improved quality, tighter registration, consumables savings and happier customers. There are many economic reasons for making the move: digital plate prices are increasingly competitive, direct to plate means no film processing, and getting up to colour faster on press means less wasted paper and ink. Perhaps the most compelling economic argument is the substantial labour savings gained through doing away with film and the expense of manual film stripping and plate making. Recent Digital Dots research indicates that a substantial number of printers using CTP found that direct output improved press utilisation. Unless you are an accountant, this may not be terribly exciting, however maximising return on invested capital is of fundamental importance to the viability of any business.

Developments in output have been relatively stable over the last couple of years, and increasingly suppliers are focusing on workflow and output management systems. There are



Computer-to-Plate Workflow

nearly one hundred platesetters for imaging metal plates on the market. They image every format from VLF output through to B3. Most new introductions are reconfigurations of existing technology, with plate handling enhancements, improved quality, throughput speed and improved return on investment for printers.

## Embrace the Digital Workflow

Output technology concerns and choice are not the biggest barriers for printers cautious to invest in direct to plate output. Workflow development is a far bigger concern for most of them, because direct to plate output requires all content to be produced in an electronic form and managed digitally. Implementing a digital workflow may be an anxious business, but efficient digital data management is vital to the twin imperatives of the modern printing business: automation and process optimisation. Advances in digital workflow optimisation have been considerable over the last couple of years, as developers work on new ways of integrating production workflows with other business systems through JDF (see the Digital Dots Technology Guide to JDF). Even if supplied artwork or films need to be incorporated into the workflow, the technology is available to do it and to manage the digital content for subsequent use. Colour contone and copydot scanning were once tricky to manage, but high resolution capture of screened filmsets or colour images is now routine and relatively inexpensive. The move to direct digital capture with high performance digital cameras is further reducing the need for image scanning.

## Where and How to Start?

When moving to CTP output, the people working with the technology are the most important variable in the investment equation. Involving operators and managers early in the process ensures well-informed investment choices. It helps build confidence so that people are positive about working with a digital workflow and direct to plate production. This will also help to make customers comfortable with new workflow routines, particularly if they have only limited digital experience.

Once the people involved are up to speed with the planned investment, a basic workflow analysis will help to identify what else will be needed, besides the platesetter. Choosing

the right workflow for your business is almost as important as the performance criteria for a given imaging engine and plate. There are many suppliers in this highly competitive market, so deciding which supplier to work with depends very much on the workflow, the type and volume of print produced, job turnaround speed, and of course the press type and format. Of course, the supplier's track record as far as service and support is also important – you are investing in both a machine and a service partner.

Many printers have started their investment planning with considering what they expect from the plate. What is the average run length? 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, including processless plates and conventional. There is only one manufacturer of platesetters that image UV plates, Basysprint, which is now owned by Punch Graphix.

New investment into CTP is also 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 Kodak are obviously in strong positions to offer good bundling deals, but platesetter suppliers also cooperate with plate manufacturers on behalf of their customers.

## Consuming Desire

Probably the single most important factor in planning your platesetter investment is plate usage. Commercial printers are spoilt for choice when it comes to devices for imaging paper, polyester or metal plates, however there are only a handful of companies that manufacture printing plates. Fortunately this handful ranges from the mega corporations such as Agfa, Fuji and Kodak, through to the bespoke such as Ipagsa. Not all of them offer processless plates, or plates for all purposes, however the choice of platesetter is as much about plates as it is about imaging, so it is important to factor plate research and development expectations, supply, delivery and cost structures into the investment plan, particularly if you plan to go processless.

**When moving to CTP output, the people working with the technology are the most important variable in the investment equation. Involving operators and managers early in the process ensures well-informed investment choices.**

In Europe the big names in platesetting are Agfa, 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


***Fuji's new blisteringly fast Luxel V-8 images a full set of plates in around 3.5 minutes, including processing!***

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.

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 in relative terms for both technologies and as the market as a whole grows. The thermal versus violet debate once more comes down to required plate performance, for processed as well as processless plates.

CTP is one of the easiest and best proven investment choices a printer can make. Direct to plate production and a digital workflow improve throughput, efficiency, quality and competitiveness. Direct output, either to plate or press, is an unavoidable step for printers who want to grow their businesses and develop their markets. Rising competitiveness in print, and print's need to compete with other media, are driving investments into direct output. CTP technologies and digital workflows are fundamental to the drive for process automation that will keep print competitive for many years.

# Developments in CTP Output

**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 evolved to meet the demands of automated output. CTP engines and plates are now available to suit every conceivable press format from 240 x 240 mm to 1524 x 2032 mm.**

*Screen's new VLF engine, the 24000, images 29 plates per hour, or 50 when imaging two B1 plates at a time at an unspecified resolution.*

## The Secret's In the Plate

For most buyers, CTP investment planning starts with the consumables. The plate is what gets ink on paper, or other substrates, and plate costs continue long after the platesetter has been written down. Plate performance and recurrent costs are fundamental to return on investment calculations.

Chemically processed metal plates have long been the only viable option for most commercial printers. The growing range of digital plates on the market has encouraged price competitiveness and higher plate production volumes bring economies of scale. Manufacturers are passing on cost reductions to end users, however manufacturers are also investing heavily in next generation plate technologies, particularly processless plates.

## Polyester & Processless

Recent developments in polyester and processless plates are such that for many printers serving the short run market, these are now viable. Kodak, Fujifilm and Agfa have all recently announced plates for imaging on a range of platesetters, either chemistry-free such as Agfa's Azura, or developed on press, such as Fujifilm's Brillia Pro-T and Kodak's Thermal Direct. Processless platesetting complements rather than replaces other forms of CTP. It eliminates chemical image development, which appeals to printers without the space for a processor, and it simplifies platemaking to eliminate one more prepress variable.

Plate performance is often the determining factor when considering whether to go processless or not. Different print applications will have different plate demands and for some, such as those using UV inks for very long runs, processless plates are simply not an option. The printer doing lots of short run, single colour work is far more likely to consider processless output. Between these extremes there are all sorts of printing environments requiring similar plate characteristics, but for which there

will be many diverse plate and output device requirements.

There is another area of development that has recently come to the fore. A number of years ago inkjet printing technology was trialed for printing plates. There have been several companies in the last couple of years showing plates imaged in this way. Indian developer Technova does inkjet based platesetting systems for small format offset printers that can be imaged on and off press. Glunz & Jensen has introduced its Platewriter 4200, which prints a patented solution onto an aluminium plate. Jetplate bases its technology

*Kodak's new Magnus 800*

on a modified Epson inkjet printer, and in both cases the RIP is based on Harlequin technology. These platesetting systems are inexpensive and easy to use, and positioned for small format printers.

## Market Activity

Although B2 platesetting has seen the most activity in recent years, there is now healthy investment in the replacement market as more and more printers trade up for faster engines. The CTP market is growing and highly competitive, embracing a huge range of printing applications. Both thermal and violet platesetters have gained broad acceptance, but there is still strenuous competition with strong arguments for both types of plate. Performance requirements and the production environment will determine whether a printer is better off with thermal or violet plates. Ultimately it is the business specific considerations, from throughput speed to how much space the printer has available, that determine what's best.

## Conventional UV

One option is to buy a platesetter that can image conventional UV plates. Several years ago a number of vendors, including Basysprint, now Punch Grafix, Escher-Grad, Esko-Graphics and Alfa Systems had technologies for digitally imaging conventional plates. They were building platesetters to expose conventional plates for printers who wanted to go CTP, without moving to a new plate technology. Conventional plates are familiar, proven, stable, competitively priced and don't need special light. Because they are manufactured all over the world, they're not subject to the import levies applied to CTP plates. Both Escher-Grad and Esko-Graphics made a go of UV imaging, but neither pursued it and the first developer to introduce a commercial product was Basysprint.

Punch Grafix's marketing rationale for Basysprint is simple. Conventional plates are stable and mature, and they are cheaper to manufacture than double layered CTP plates. According to Punch Grafix, they produce a sharper dot with Basysprint technology and the chemistry in the processor is relatively harmless. Punch Grafix is now focusing exclusively on this CTP technology, and is not offering Strobbe platesetters direct to the market. The company will continue to manufacture CTP equipment for Agfa, specifically the Advantage and Polaris engines for newspaper platesetting.

The UV platesetters aren't cheap though,

starting at around €100,000, but Basysprint's installed base is estimated to be around 550 engines, so prices are coming down quite considerably. If Basysprint can make some favourable deal with a plate manufacturer, which is crucial to its future, these engines could be even more attractive to printers reluctant to move to digital plates.

Basysprint is the only vendor of UV platesetters in the market, so the company has no direct competition. If the technology is successful, there are plenty of companies who might want to OEM it, but this is a big if. The fact that no other company is doing the same thing, doesn't do a lot for customer confidence. Basysprint's primary competition is blue-violet laser imaging on light sensitive CTP plates, especially machines from Agfa, Fuji and Screen, all of whom are well established in the market and all of whom have no intention of losing sales to Basysprint.

## Hardware Advances

Whether it's imaging UV plates or digital plates, CTP hardware developments are about bringing down costs, changing speed options, automation flexibility and application scope. VLF output engines for example, can be sold on the basis of their flexibility or imaging a wide range of plate formats. Cost reduction drives most current developments, which is why violet diode based platesetters are doing well.

## Violet vs. Thermal Engines

Optical systems based on violet diodes are relatively inexpensive, last a long time (longer than the platesetter itself according to some suppliers) and expose a plate quickly. With only a few moving parts, they are also less costly to build. Thermal imaging devices have their advantages too, such as being able to image proofing material, as well as flexo, waterless and processless plates. Thermal meets the most stringent quality demands, and thermal plates are tough and long lasting: some are rated for runs of over two million when baked. Thermal plates can also be handled in normal daylight, so they are convenient too.

Platesetters evolve in tandem with consumables, hence the increased number of violet technologies. Higher powered violet diodes image photopolymer plates as well as silver halide plates, which also fuels development. Thermal imaging has been the only option for processless plates, however Fujifilm and Citiplate have introduced violet imaging processless plates. Fujifilm's violet processless plate will not be brought to market until more powerful lasers (150 to 200mW) come onto the market.

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 100mW devices from Krause, Highwater and IPA.

Agfa and Screen are still the only companies to develop thermal devices based on Grating Light Valve technology. This diffracts single light sources into multiple light channels for much faster imaging and 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

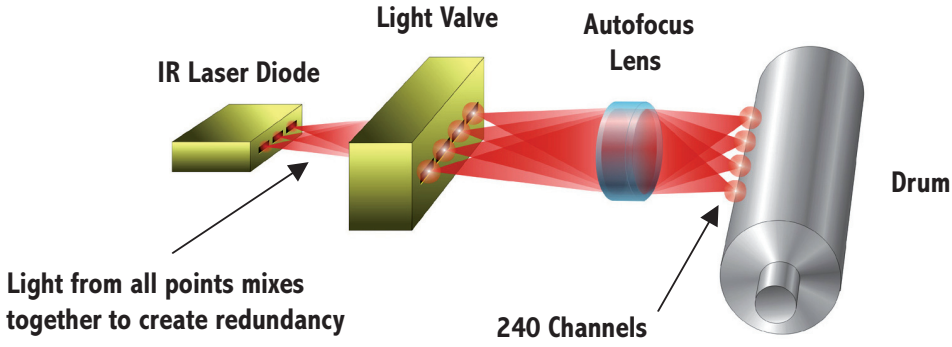
per hour. Agfa's Avalon VLF 83 images 18 2110 x 1600 mm plates per hour at 1200 dpi also using GLV based imaging.

Thermal imaging is still the best choice for really long runs, because of the demands on the plate. Most thermal machines are used in 8-up and VLF applications where throughput requirements and print runs are high. Kodak is the leading supplier of thermal engines with devices available from 4-up to VLF, supporting a huge range of applications and workflows. There are now several 2-up thermal engines on the market such as the Agfa Acento based on GLV and capable of imaging conventional and processless digital plates.

Agfa has a large range of devices, both thermal and visible light, as do Screen, Heidelberg and Fujifilm. 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.

Service and consumables are central to the CTP decision. Technology sharing is endemic in the CTP business, so clearly hardware is no longer the issue it once was. Screen sells engines to Agfa, Fujifilm and Heidelberg. Strobbe sells machines to Agfa. Re-badging gives suppliers the flexibility to develop product lines for their particular markets, and to add their own service strengths. Printers can focus on getting the right service and support, instead of worrying about hardware reliability.

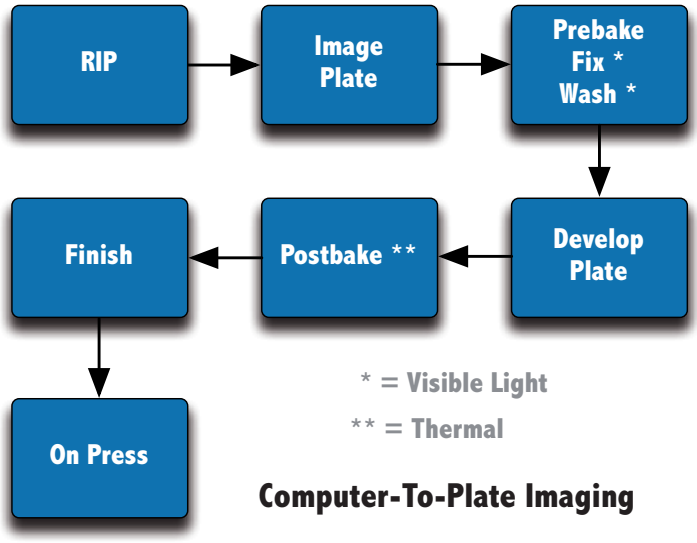
CTP suppliers put together training and service packages, often including consumables, according to their company strengths and the requirements of their markets. Many printers work out their general service and support needs as part of their technology selection. Good service can make a huge difference in making a successful transition to CTP production, and many printers also include a comprehensive training budget as part of their planning. Going to CTP means taking the final step to a fully automated digital workflow and for many printers this is a big step, often more traumatic than the CTP investment decision. With JDF becoming reality for competitive production, it is even more important to provide workflow management training early on.




***This illustration has been used by Creo (now Kodak GCG) for a long time to show the technology behind thermal imaging with a IR laser diode, on a external drum based CTP.***

# Computer-to-Plate Imaging Pros & Cons

**Given the widespread adoption of computer-to-plate production and the many success stories, it is surprising that discussions as to the pros and cons of imaging technologies are still so passionate. There is still fierce argument as to whether violet or thermal imaging is best, but fortunately the market is providing support for both. Imaging technology is still highly contentious for many people but the market has moved on, particularly since Kodak, which is committed to both, acquired Creo, thermal's leading and most vociferous evangelist.**




**Computer-To-Plate Imaging**

## Thermal Imaging

Thermal plates have a grained and anodised 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 diffraction gratings to generate a high intensity laser beam. The exposure points depend on the amount and duration of light hitting the plate surface. Thermal imaging can be used for digital halftone proofing as well, so proofs and plates can be output on the same imaging engine to save equipment costs and ensure output accuracy. Thermal imaging is also used for imaging waterless, flexographic and processless plates.

Thermal imaging uses laser light to create intense heat to either make soluble the coating material in positive thermal CTP plates or make it insoluble in negative CTP plates. 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 and imaging works in several ways. The surface can be removed by ablation so that it effectively bursts away from the base. In positive CTP the laser energy weakens chemical bonds in the plate's surface and it dissolves away, either in subsequent processing or on press. In negative CTP the plate's sensitive coating is polymerised and

the unexposed area dissolves in the processor chemistry. Once exposed and processed, the plate's surface is extremely hard and durable.

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

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. They can be baked to last for as many as two million impressions and sharp dots accurately placed provide the printer with a quality control benefit. This is attractive to customers, as is support for stochastic screening: tiny, thermally imaged dots are ideal for printing stochastic screens.

Stochastic screening is an important contributor to quality and improves inking efficiency because the dots are so precise. Stochastic screening 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. Because a collection of small dots has greater edge length than one large dot, ink accumulates at the dot's edges, hanging out beyond it, so stochastic screening can in fact increase dot gain, compared to AM screens.

Thermal imaging produces plates of extremely high quality and output resolution. They can also have greater repeatability and consistency than visible light equivalents, although 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 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

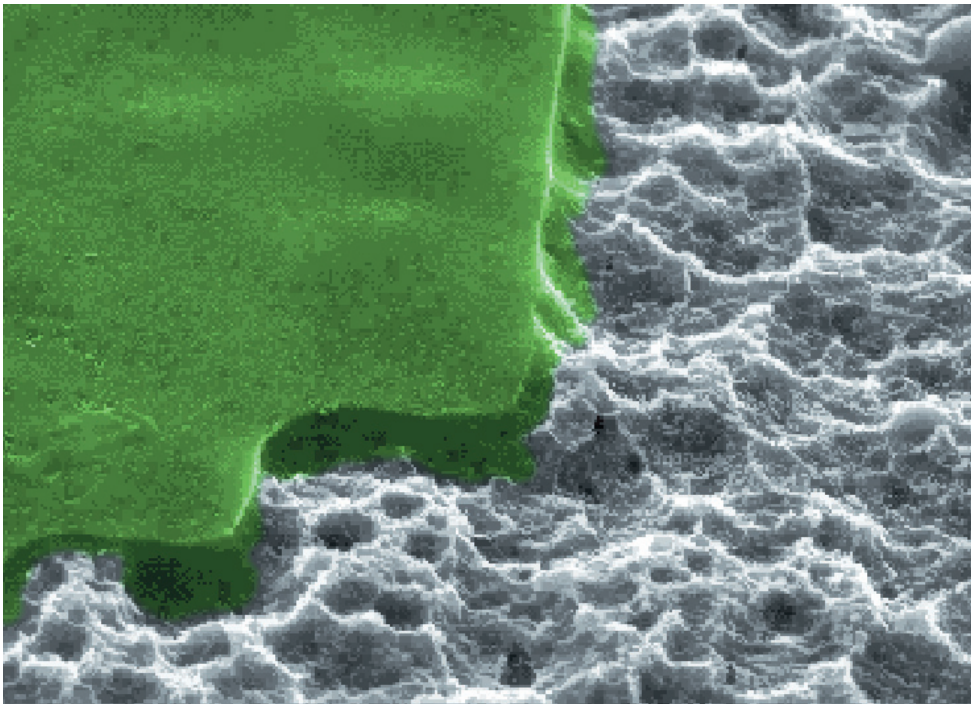
powered infra red laser is reflected in the price of the platesetter.

## 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. For a number of years the VLF and 8-up markets have been relatively flat, however both are seeing increased activity as printers replace their platesetters with current technologies. The B2 market, where printing applications vary so hugely, is still showing the most signs of activity. However arguments for thermal or violet are much harder to qualify for B2 applications because of the market's diversity.

## 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, but visible light plates are coated with a light sensitive material, either silver halide or photopolymer based. When exposed to light the surface responds to create an image. Visible light imaging techniques can also expose conventional UV plates which has been attractive to many purchasers of computer to conventional platesetting (CtCP) systems. UV plates are cheaper than their



***A microscopic view of a plate as imaged with Kodak's Squarespot thermal technology. Note the straight sides and flat surface of the dots.***

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 or archiving.

**FM Screening:**

***Frequency Modulated screen where the dot size remains constant and the number of the dots varies.***

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 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 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.

Several factors should be kept in mind when considering violet plate technology. These are negative working plates so the resolution is generally not as good as it is with positive thermal plates. This is one reason for the widespread usage of violet plates in the newspaper industry. Violet plates need a prebake prior to developing in order to halt the polymerisation of the coating, and the processor is larger and can be more expensive.

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 will continue to simmer because the platesetting market and imaging technologies are evolving to support an ever broader range of printing applications. 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 it is the business' needs that should drive the choice.

# CTP Plates Overview

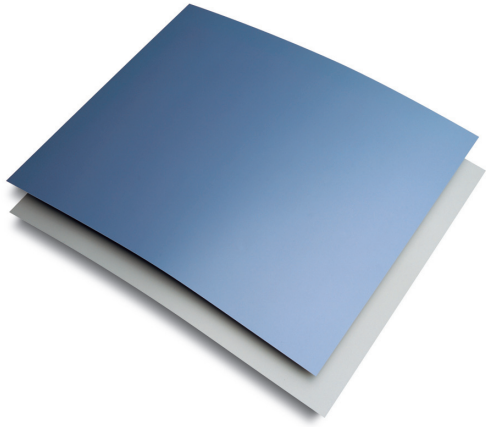
**Computer-to-plate production is no longer just a possibility for the printing industry, it's a proven reality with over 26,000 of these engines estimated to be in use worldwide. Many printers are investing in second and even third generation technologies, having benefited from improved returns on press investments, improved print quality, tighter deadlines, cost savings, and the benefits of a digital workflow. CTP is about process automation and improving the competitiveness of print in a media market that is both overcrowded and unpredictable.**

For most printers it is the digital printing plate requirements that shape platesetter choice. Plate performance is crucial to the success of the CTP output. Current digital plate sales are around 170 million square metres annually, and the market potential is some 480 million square metres. The market benefits from a wide range of suppliers, high volume manufacturing, keen prices and technology advances, especially for processless plates.

## Plate Perfection

There is no such thing as the ideal plate for all purposes, because performance requirements vary according to the sector. Printing plates put dot patterns onto a final substrate, without distortion and with accurate, consistent placement. They must be precise, easy and stable to work with, economical to use and last as long as the print run demands, if not longer.

Virtually all metal plates are based on grained and anodised aluminium, coated with UV, visible, or heat-sensitive layers. Presstek use what they call an 'equivalent' hydrophilic layer. When imaged the plate is exposed with either thermal energy or visible light. During processing, the non-image area is removed leaving just the image area which is ink receptive, or oleophilic, and the non-image area which is water receptive, or hydrophilic. Silver halide and light sensitive photopolymer based plates are imaged with visible light from 405 nm to 680 nm. Silver halide plates have a hydrophilic (water loving) anodised aluminium base coated with a high speed emulsion. Visible light photopolymer plates are coated with a film speed photopolymer and these are most commonly imaged with blue or violet light.



***Is this Fuji's Brillia HD LPNV2 or just another square of blueness?***

A thermal plate has an aluminium base with a heat responsive, possibly multi-layered polymer coating. For many years all digital plates have required chemical processing to develop the laser exposed coating and prepare the plate for use on press. Chemical processing takes production time and introduces a whole

series of process variables, which must be controlled, not to mention chemical costs and environmental issues. The availability, after many years' anticipation, of processless and so called chemistry-free plates is one of the most significant advances the printing industry has seen in years. However these new plate technologies are still heavily outsold by digital plates that require processing.

## Silver Halide

Since their introduction in the early 1990s, silver halide plates have been successfully used in all sorts of printing applications, from newspapers to commercial print. Critics state that silver content makes a plate vulnerable to chemical interactions with processing chemicals, fount solutions and even ink and substrate materials. However this is really only an issue in harsh environments such as on highly corrosive UV presses, where baked plates are more suitable. Eroded silver in the processing chemistry requires disposal however and this involves cost and some environmental impact, albeit small.

Silver halide plates, imaged with red or green light, are extremely sensitive to light and require red light handling in a darkroom. Violet plates can be handled under yellow light, so they are much more convenient than alternative visible light imaged plates. Most manufacturers are seeing a significant shift to violet.

Silver halide visible light plates cannot be baked for long runs, however used on a wide range of presses, from small B3 to newspapers, they have a reputation for robustness, stability, consistency and reliability. They support high resolutions and can render a wide tonal range. Economies of scale keep silver halide plate prices very competitive, even though Agfa is the only manufacturer offering this technology.

## Photopolymer

High speed photopolymer plates, imaged with violet or green light are, like silver halide plates, sensitive to visible light so in a manual CTP system require darkroom handling. Photopolymer plates are very consistent and durable, and well able to compete on run lengths with thermal. Some can be baked for even longer runs. Their surface content is polymer based and so immune to undesirable chemical interactions. Photopolymer plates have the added benefits associated with visible light imaging and are particularly popular for newspaper printing. Photopolymer plates can now support equally high resolutions as silver halide and print a tonal range from 1–99%. Some photopolymer plates need a pre-heat stage prior to development in order to complete the photo-initiated polymerization process.

**Current digital plate sales are around 170 million square metres annually, and the market potential is some 480 million square metres.**

The latest generations of violet imaging plates are taking market share from those imaged with red and green light. Violet plates are sensitive to shorter wavelength light present in the blue area of the visible spectrum. Because of the low energy requirements the plates are suitable for internal drum platesetters. The mirrors in the platesetter's optical system can be very small – small mirrors can spin

extremely fast, helping to improve productivity and imaging precision for sharper dots capable of rendering a wide tonal range.

## Thermal Plates

Thermal plates consist of an electrochemically grained and anodised aluminium base coated with polymers. Once exposed and processed the plate surface is extremely hard so it's suitable for long runs, especially when baked. Because most are only sensitive to thermal energy of more than 800 nm these plates can be handled in daylight. Some 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 a very sharp image spot. The spots on a thermal plate, as is the case with some photopolymer plates, have straight sides and flat surfaces and can be very small. Thermal plates can support 1–99% 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. Increasingly this is true of photopolymer technologies. 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 and Chemistry-free

Processless plates is by far the area of most excitement at the moment. CTP is all about automation and efficiency, and processless plate production supports this concept. It helps eliminate process variables including the problems inherent to chemical processing and the difficulties of maintaining a stable environment. It also partially solves the chemical disposal conundrum, since there are fewer chemicals involved. Processless production might even help improve the cost of ownership for platesetters, since with exposure times coming closer to those of existing pates, more plates can be produced in the same amount of time. Currently only Fuji's Pro-T technology can be imaged in roughly the same time as processed plates, most of which take around 30 to 40% longer. Like photopolymer and thermal processed plates, some processless plates can hold 1–99% dots and 200 lpi screens so there is a quality consideration, especially if FM screening is required.

Processless plates use either thermal or violet light energy to expose the plate surface, with limited processing – 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 remove the non-image area either with ablation, phase change or wash off technology.

Ablation plates are exposed with a high powered laser which causes the plate surface to burst away from the base. This technique can require some means of debris collection and disposal in platesetting devices where dust could settle on mirrors and lenses. This has to be built into the device, which can add to its cost. With a wash off or chemistry-free plate, laser energy causes the coating to change its solubility. Subsequent water washing, gumming or fount solution removes the soluble areas either in a special bath or on press.

## What Cost a Plate?

Plate costs are difficult to identify independent of capital equipment costs and quantity discounts. Prices vary with plate volumes and the nature of the contract, including support and maintenance. They even vary with geography. Although the price of a digital plate has been substantially higher than its analogue equivalent, prices have been coming down. Even though the major manufacturers recently announced price rises, in relative terms the cost of digital plates has fallen. Rising platesetter sales and increased digital plate usage have lead to economies of manufacturing scale benefiting individual customers and the market as a whole.

## Plate Characteristics

Choosing a plate depends on what the plate is for and the press it will run on. Once the format and performance criteria are clear, it's a matter of working out production constraints, and identifying quality and reliability expectations. Quality can be measured using screening, output resolution and line screen requirements, the need for FM screening and so on. Performance requirements can be based on average run lengths for the presses, the range of substrates printed, plate production speed, platesetter and press availability.

Consider also the working environment and space available for a new plate line, as well as temperature controlled storage of plates (20–25 degrees Celsius). Processing issues include equipment and chemistry, cost, chemical storage and disposal, and support – especially where deadlines are tight. Support costs are an important part of annual plate contracts. Make sure to check call out costs, and penalties for not fulfilling the plate contract if plate requirements change, either for volumes or product choices.

## What's What?

The major international suppliers of digital and analogue plates for commercial printing applications are Agfa, Fuji and Kodak. Plates are also available from a number of other companies, such as Ipagsa, which offers two digital plate products, Presstek, whose focus is on direct imaging presses and its own CTP technologies, and Citiplate, which operates exclusively on an OEM basis serving the US market.

### Agfa

Agfa has the industry's broadest portfolio of plate products, and 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 1–99% at 200 lpi.

Thermostar P970 is Agfa's positive thermal plate for commercial applications. Agfa's new line of Energy digital plates will be phased in from November to gradually replace Thermostar. Energy is a stable, high contrast thermal plate with an ablation level that Agfa claims reduces processor maintenance. The plate has wide press latitude and is rated for 150,000 impressions and over one million when baked. Resolution is 1–99% for up to 200 lpi and Energy can image FM screens.

Energy Marathon is high performance version designed for runs of over one million

# Agfa: Profile

## Agfa Graphic Systems

### Origins:
Founded 1867 to develop photo products and chemical dyes. Product portfolio includes digital and analogue consumables, equipment and software. Producer of printing plates for over 50 years. Shipments of digital plates since mid 1990s.

### Headquarters:
Mortsel, Belgium

### Employees:
7165

### Organisation:
Global with 40 sales organisations dedicated business groups for commercial, newspapers, packaging and industrial inkjet

### Estimated turnover:
€1.99 billion

### Development Priorities:
Innovation in digital plates, industrial inkjet printing

### Products:
Thermal, violet, silver and chemistry-free plates from 2-up to VLF, platesetters from B2 to VLF, digital presses, proofers, workflow and colour management systems.

or more with baking. Based on new graining technology Agfa says it the most robust plate on the market, with improved run length and lower blanket cleaning frequency.

Energy Elite is a non-bakeable plate with a special patented base layer beneath its top layer. It has superior chemical resistance making it compatible with UV inks, alcohol substitutes and aggressive press chemicals. It is good for run lengths of around 350,000 impressions.

The Thermolite processless plate is designed for on press imaging with a suitably designed digital press 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 latex coalescence plate with a wash off chemistry-free coating that is suitable for 100,000 impressions. Based on Thermolite, it has an aluminium base coated with small thermoplastic particles that laser energy causes to 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. It is positioned for 2-up and 4-up and lower volume 8-up CTP, producing up to 8000 $m^2$ annually and there are now approximately 600 companies using this plate.

Amigo is Agfa's next generation, bakeable, chemistry-free plate based on its Thermofuse technology. It is structurally the same as Azura with latex layer added to a grained and anodised substrate. A thermal laser imaging at around 830nm melts the latex pearls and fuses them to the substrate. With Azura, the unexposed areas of the plate are removed during gumming, however Amigo is designed for longer runs and needs a little more help to

achieve durability. The plate uses a 'Clean Out' solution, which removes the non-image area. Agfa describe the technology as developer free, since it involves no conventional plate image development.

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 acquired Lastra and its commercial printing products. The Diamondplate LY-8 photopolymer plate is imaged with 532 nm YAG light. The 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.

## Fujifilm

Fujifilm's Brillia digital metal plates are suitable for numerous printing applications, including UV printing, with both thermal and violet photopolymer options. For newspapers there are three options. The LP-NN2 photopolymer plate is imaged with green light and is good for runs of 300,000 as is the LP-NNV violet imaging photopolymer plate. The LH-NN thermal plate lasts for 200,000 impressions, and is rated for resolutions of 1–99% rather than the 2–98% of the photopolymer plates.

For commercial applications the LP-NV2 is a violet photopolymer plate, and LH-PJE and LH-PCE are thermal plates. These two differ in that the LH-PCE can be baked for runs of 1,000,000 whereas the LH-PJE is suitable for 300,000 impressions. All of these

## Fuji: Profile

### Fuji Information Systems Division

***Origins:***
Founded 1934 to develop and produce film for the movie industry. Product portfolio includes digital and analogue consumables, equipment and software.

Shipments of digital plates since 1997.

***Headquarters:***
Tokyo, Japan

***Employees:***
Around 23,000

***Organisation:***
Global with 200 consolidated subsidiaries in more than 20 countries.

***Estimated turnover:***
€1.8 billion

***Development Priorities:***
New digital plate technologies, electrophotographic and inkjet printing, workflow

***Products:***
Thermal, violet, and processless plates from 2-up to VLF, B1 and B2 platesetters, workflow and colour management systems.

plates are rated for 200 lpi and 1–99% output resolutions. Fuji's next generation Brillia High Definition CTP plates, the LP-NV2 and LH-PJE, are based on the same new emulsion as is used in Fuji's processless plates.

## Processless

Fuji has two negative working processless plates, the Brillia Pro-T thermal and the Brillia Pro-V violet. The violet plate is currently a technology rather than a product announcement, but this plate will have comparable performance to the Pro-T thermal plate. Both will compare favourably to the performance of Fuji's other digital plate offerings: production speeds equal that of the other Brillias, and they can image FM screens. Run length and on press performance are equivalent, so printers won't have to make any compromises in order to move to processless output.

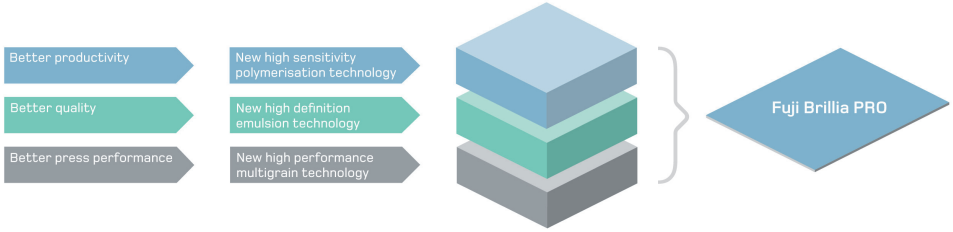
Fuji's processless plates are based on micro-etch technology that creates a multigrained surface capable of better on press performance than was previously possible with processed plates. Fuji has developed a high definition emulsion for better quality, and a high sensitivity polymerisation technology for fast imaging.

The Brillia Pro-T is a no bake 830nm thermal plate based on Fuji's high sensitivity polymerisation technology. It is developed on press, rated for run lengths of 100,000 and will be available in the first quarter of 2006.

The Brillia Pro-V violet imaging plate will be commercially available one year after the Pro-T. It is based on the same technology, but works for runs of around 200,000 and requires gumming. It will be able to print aggressive UV inks without baking, and support longer run lengths if baked. Because of the gum processing there is no need for yellow light.

The Pro-V images at around 405 to 410nm and requires a higher powered laser than is currently available, hence the delay in its introduction. The violet diodes generally come from Nichia, one of the earliest developers, and the current technology can be driven at up to 150 milliwatts, albeit compromising the life of the diode. A 200 mW diode currently has an estimated two year life, but higher powered diodes that last five to ten years are coming along. Fuji expects to see 300 mW within the next couple of years with acceptable life, although they are understandably coy about what exposure the Pro-V plate will need.

**Fuji Brillia PRO** no compromise processless plates




***Fuji's new violet plates can hold resolutions of 1-99% and 300+ lpi screens.***

# Ipagsa: Profile

**Ipagsa**

***Headquarters:***
Barcelona, Spain

***Origins:***
Founded 1985 to develop printing plates
Product portfolio includes digital and analogue consumables.

Shipments of digital plates since 2002.

Ipagsa is the only digital printing plate manufacturer exclusively developing, manufacturing and distributing printing plates for end users.

***Employees:***
160

***Organisation:***
Presence in over 50 countries.

***Estimated turnover:***
€48 million

***Development Priorities:***
Continued improvement to existing technologies and processless plates

***Products:***
Analogue and digital printing plates, plus associated chemistries for all and any size requirement.

## Ipagsa

Ipagsa has a small but healthy share of the consumables market, with two digital products. The Rubi T50 thermal plate images at 830nm and customers like it for its excellent resolution (this plate is certified for Kodak's Staccato 20 screening technology) and resilience. It can handle very high run lengths of well over 300,000 without treatment, one million baked, even with UV inks.


*Ipagsa headquarters in Barcelona.*

Ipagsa's Arte IP-21 830 nm thermal plate is for markets needing fast imaging, such as commercial printing. Arte IP-21 is suitable for run lengths of up to some 150,000 impressions and much more when baked. With Arte, Ipagsa sacrifices run length for speed, so the plate is a logical complement to the Rubi. Arte technology is Ipagsa's foundation for a chemistry-free or processless plate in the future.

## Kodak

Like Fuji and Agfa, Kodak offers both thermal and violet plates. Kodak is selling violet imaging platesetters for commercial platesetting, and has a violet newspaper device.

Kodak has a substantial number of digital plates, including thermal and rather more recently, violet. Since Kodak's first digital plate came onto the market in January 1996, the Thermal Printing Plate/830 has been tried, tested and proven for accuracy, reliability and repeatability. It is popular with both high quality commercial sheet-fed colour printers and heatset web publication printers and there are over 1,200 platesetters around the world imaging it. This negative working 830nm thermal plate requires 150–175 mJ/cm$^2$ to image and is suitable for run lengths of over 150,000 unbaked or over one million when baked. In Europe, the Middle East and Africa, TP-830 plates have been superseded by DITP Gold technology.

The DITP Gold plate is a third generation plate and is designed for high speed production in commercial printing applications. Besides being fast to image (energy requirement 100 mJ/cm$^2$), it has greater imaging latitude and less ablation than its predecessor. When baked it can print run lengths of over one million (150,000 unbaked) with a high degree of resistance to hostile press environments. Thermal Gold is a similar product sold in North America, with a slightly different substrate. DITP Gold can also be used for applications such as packaging or for exposure in conventional UV frames, in Europe, Africa and the Middle East.

Thermal News is a thermal plate based on similar technology exclusively for newspaper production. It is fast and suitable for run lengths of over 200,000 without post-baking, with high sensitivity, wide processing latitude and a reputation for consistency. It requires 120 mJ/cm$^2$ to expose.

Of the digital thermal plates by far Kodak's most popular product is the Electra Excel, known for its reliability, consistency, accuracy

## Kodak: Profile

### Kodak

***Origins:***
Founded in 1888 to develop imaging consumable products. Product portfolio includes everything to do with digital imaging for any application. Shipments of digital plates since 1995.

***Headquarters:***
Rochester, New York, USA.

***Employees:***
GCG: 12,000

***Organisation:***
Global with a presence in over 150 countries structured into three divisions. The Graphic Communications Group (GCG) is responsible for all aspects of the graphic arts business.

***Estimated turnover:***
GCG: $724 million

***Development Priorities:***
New plate technologies, imaging technologies, workflow, electrophotographic and inkjet printing, business management.

***Products:***
Thermal, violet (limited), and processless plates from 2-up to VLF, B2 to VLF platesetters, digital presses, proofers, workflow and colour management systems.

and versatility. Electra Excel requires no pre-heating or post-baking and has excellent resolution and reproductive range. It is popular with printers because it is simple to process, has a wide operational latitude and spectral response, and is generally easy to use. These plates require 150 mJ/cm$^2$ of laser energy for exposure, and can be optionally post-baked for runs of one million or more, or for use with harsh press chemistries or UV inks. The Electra Excel range has recently been updated with a "high resolution" version (HR) for better performance with stochastic screening.

**There is no such thing as the ideal plate for all purposes, because performance requirements vary according to the sector.**

The Sword Excel plate is a third generation of 830 nm thermal plate with higher resolution and faster imaging speeds than its predecessor. It is tougher, so suitable for longer run lengths (over 500,000) and requires no pre-heat or post-bake. Sword Excel is a similar positive plate sold in North America that develops in a negative processing solution. It requires 120 mJ/cm$^2$ of laser energy for exposure.

In the United States Kodak sells its Scorpion Waterless plate, a negative working thermal plate suitable for up to 100,000 impressions. These plates provide high resolution with good durability and imaging consistency. They require 170 mJ/cm$^2$ laser energy for exposure.

Kodak is keeping two ex-Creo plate products: the PTP positive thermal plate, and the Clarus WL Processless polyester plate for direct imaging presses. PTP is a long-run positive plate which requires no pre or post baking and can image dots as small as 20 microns, so it is suitable for stochastic screens. The plate is compatible with a wide range of press chemistries and alcohol substitutes. Clarus WL is a roll media for direct-imaging presses such as the Heidelberg Quickmaster 46DI, Ryobi 3404DI and KBA Karat 46.

## Violet Offerings

It is impossible to see what the future holds for Kodak's violet imaging, given Creo's blind obsession with thermal imaging. However the company has emphatically stated that "Kodak is committed to providing our customers with the ability to choose the technology that best suits their business either thermal or violet, that is why the commercialisation of Violet Print, our violet plate for the commercial market, was announced in October." Kodak's violet photopolymer negative plates are manufactured at what used to be the KPG factory in Osterode, Germany and are available as the Violetnews plate for newspapers and the Violet Print plate for the commercial market. This plate is in production at 100 B2 commercial sites and is suitable for runs of around 200,000 unbaked. It can be baked for longer runs.

## Processless Plates

Thermal Direct is a thermal plate imaged at 830 nm and requiring energy of 325 mJ/cm$^2$ to image. It is suitable for run lengths of around 100,000 and Kodak claims that it is special because it has a reduced coating thickness that helps it perform better on press. There are now over one hundred users of this plate worldwide, which was commercialised at Print '05.

## Presstek: Profile

**Presstek**

***Origins:***
Founded in 1987 originally to develop direct imaging press technologies.

Product portfolio includes digital imaging electronics, analogue and processless digital consumables, equipment and software.

Shipments of generic processless digital plates since 2005

***Headquarters:***
Hudson, New Hampshire, USA

***Employees:***
1,000

***Organisation:***
Offices in USA and Europe

***Estimated turnover:***
$270 million

***Development Priorities:***
Processless digital plates, imaging electronics and direct imaging presses

***Products:***
Platesetters, analogue and digital consumables, imaging electronics for OEM customers, a direct imaging press.

## Presstek

Apart from OEM plates, Presstek's processless plates are all thermal ablation plates imaged at 800 to 1200 nm. Many of them, such as Anthem and Freedom, are specifically designed for Presstek's own platesetters. Pearldry plates for direct imaging presses are used for waterless printing up to 20,000 impressions. Presstek Aurora thermal chemistry-free plate technology runs on third party platesetters and Presstek recently qualified Aurora for Kodak Trendsetters and Screen's Platerite platesetters

Applause was Presstek's first truly processless plate and was designed for on press applications, but it also runs on Presstek's Dimension series platesetters. It is rated for runs of 100,000. Presstek expects to qualify this plate for third party imaging systems as it has with Aurora. Applause is processless in that it does not need to be rinsed before use. Aurora, Anthem and Freedom need to rinsed with water and are therefore classed as chemistry-free.

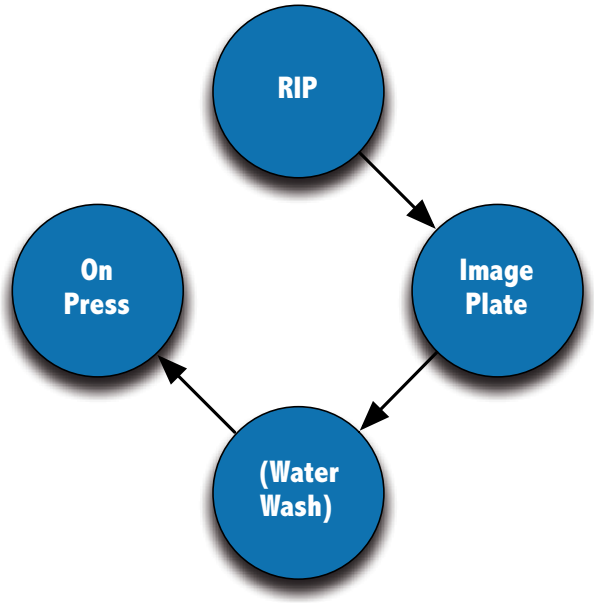
## Next steps

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.

# Processless Platesetting

**For successful print production, the watchword today is automation. Process automation is what computer to plate production is all about, but now that we have successfully removed film and the associated processing chemistries from the workflow, the foundation is laid for the next crucial stage in the evolution of print production. Processless platesetting, with direct imaging of press ready plates, is central to the future for consumables manufacturers, platesetter developers and printers alike.**

The idea of processless, or chemistry-free imaging, in and of itself, is of course not news. Theoretical processless technologies have been around for years and as long ago as 1995, Xerox was touting its Verde processless film and Polaroid its Dry Tech film. But interesting as they might have been to chemists and some journalists, neither of these products, or their competitors, went anywhere. As direct to plate output heralded the future for more and more printers, the days of film-based production were numbered. Today, with CTP a reality, the industry is looking to new processless horizons, but this time based on plates not film.




**Processless Computer-To-Plate Imaging**

Actually we shouldn't really use the term processless. Without exception the current generation of processless, or chemistry-free, plates require a subsequent process to develop the image on plate. They don't need special chemicals but they all require, either gumming, a water wash or removal of a surface layer on press. They take conventional plate processing out of the production workflow, but to describe them as processless isn't really accurate.

## How They Work

These plates are imaged with either ablation, phase change or wash off technology. Those relying on ablation, such as the Anthem, Applause and Freedom from Presstek, are exposed with a high-powered laser that causes the plate surface to burst away from the base. Some means of collecting the dust and disposing of it has to be either built into the platesetter or it gets removed on press. Only

***Processors such as this, the Fuji FLP-126, are redundant for processless plate imaging.***

Presstek's Applause coating is completely vapourised during exposure.

Phase change technology, as used in Citiplate's products, Kodak's Thermal Direct and Fuji's Brillia Pro-T, creates an image on the plate when polymers in the coating cross link and bond with the substrate during exposure. The areas that do not link are soluble and are removed on press to complete the development. The image on plate is not clearly visible until this wash-off stage is complete, so measuring the plate, and so linearising the platesetter, requires some sort of a workaround.

Agfa uses a latex coalescence technology in its Azura and Thermolite plates, which are used in direct imaging presses. The plate coating is composed of tiny rubber pearls that melt and fuse to the plate surface during laser exposure.

The plate is then finished with an inexpensive mixture of gum and water to create the printing surface. The gumming can help enhance the plate image.

## Automation & Efficiency

A chemistry-free workflow has much to recommend it, apart from the fact that it is more environmentally friendly, convenient and helps streamline the workflow. Doing away with plate processing makes platemaking easier for operators, improves production throughput and reduces consumables costs. However probably the most important benefit is the removal of a whole range of variables from the workflow. Doing away with plate processing variables and additional production stages is what automation efficiency is all about.

And there are many variables when it comes to both digital plate imaging and plate chemistries. In fact all processes contributing to plate production need to be constantly monitored, because they inevitably stray from optimal performance. An imaging system laser will degrade over time and eventually fail, but plate processing chemistries change every time a plate is imaged so they are far more vulnerable. Chemistry strengths in the plate processor vary according to temperature, cleaning frequency, water condition, the coating on the plate, the number of plates going through the processor, and even the screening percentages on plate. These are just some of the reasons why printers have to carefully monitor their processing chemistry. All of this adds up to many arguments in favour of chemistry-free processing.

### What Price Plate Processing?

***Put a price on the following processor maintenance tasks. Think Time, Frequency and Money:***

- ***Checking processor parts***
- ***Checking chemistry levels***
- ***Cleaning all the tanks***
- ***Chemisty replenishment***
- ***Waiting for processor maintenance***

***Does it add up for sticking with what you've got, or for change?***

On the negative side, chemistry-free plates can take longer to image than their processable equivalents, which some critics argue could impact laser life. These plates have mostly been suitable for short runs, but Fuji's new Brillia Pro T will still be going strong at 100,000 impressions and the violet version an amazing 200,000 baked, assuming Fuji achieves its design target. Another negative is the fact that it might be harder to see, and so measure, the image on plate, which could make device linearisation and profiling a bit problematic. Also, these plates still require more energy to image and they may also be more expensive, because they are not yet produced in substantial volumes. However, given the significant investments manufacturers are making into new plate lines, the latter argument won't last long. Where the arguments will last long is whether thermal or violet processless plates are the best option. As with the processed plates, this one is likely to run and run!

## Thermal & Violet Processless

We expect to see a number of processless and chemistry-free plates coming onto the market in 2006 and 2007, for both thermal and violet imaging. It is too early to say how well they will perform for a given production application, but the important thing for printers here is choice. There are several suppliers of both technologies, and platesetter developers are already testing these plates with their current and next generation engines. So printers interested in chemistry-free output, can be confident that they will be able to choose the plate technology that best suits their needs.

Violet chemistry-free technology is running behind thermal developments at this stage, largely because the plate coatings require more powerful violet laser diodes to image than are currently available. However companies such

as Fuji and Citiplate in the United States have announced products and more will surely come. Fuji's Brillia Pro-V violet plate will be available in early 2007 and Citiplate is testing a possible product under controlled conditions. We understand that Konica/Minolta has a violet plate under development and due for release in 2006, but no further details are available yet.

There are also companies working on using inkjet print heads to apply a light sensitive surface to lithographic plates. The idea is to expose the layer and remove either the ink receptive or non-receptive areas from the base. A couple of companies have declared their interest in this business, most notably Jetplate in the US. However the Jetplate spray-on technology still requires plate processing chemistry and curing.

There are several thermal chemistry-free products around. Agfa, Kodak and Presstek have all brought products to market. Presstek has been in this business the longest, however until recently Presstek only sold plates for its own imaging technologies. Now the company's Aurora plates are qualified for platesetters from Kodak and Screen. Agfa probably has the largest market share with its Azura plate with around 600 customers imaging an average of around 1500 square metres per month.

Several of these plates can go straight from imaging onto press, and processless technology is absolutely required for direct imaging presses. The current generation of these presses does not allow simultaneous on-press platesetting during a print run. Ongoing developments at press suppliers such as Wifag may change this though. We've also got Man Roland's Dicoweb technology, another possible future route for on-press imaging. We can expect to see printing surfaces, either the cylinders or plates, imaged on press while the press is running someday, but in the meantime printers can more easily and less riskily make the move to chemistry-free and processless platesetting.

## Key Questions to Ask

- What's the run length for the plate?
- Can it be baked?
- What are the processing requirements?
- What type of imaging technology is used?
- What format sizes are available?
- How much does it cost per square metre?
- How much energy is required to expose the plate?
- What percentage screen tints can the plate hold?
- What platesetters are qualified for this plate?
- Are there reference customer sites nearby?
- What measuring device is recommended for density checking?
- How can the plate be used for checking platesetter exposure?

# Managing investment into CTP

**For most users the primary reason for investing in computer to plate (CTP) is the need for production improvement. Speed, quality or both are, for most users, the primary motivation for buying a digital platesetter. There are many intangible factors shaping the importance of these reasons, which vary with sector and production throughput volumes. This is one of the reasons why formal investment models for managing CTP investment, are so rare.**

## Platesetter Market Background

In the last few years there has been a drastic fall in the number of platesetter manufacturers actively developing and building new devices. This is in part natural attrition in a market where everyone and his dog saw a golden future in platesetter manufacturing. However it is also about the market's requirement for consistent investment into new advances, and the high cost for manufacturers of maintaining and developing market share. We estimate that the worldwide market for digital plates is well in excess of 485 million square metres. In just one decade, more than 40 percent of the established markets for digital platesetting have already converted to this form of output. There are plenty of markets that have yet to be explored however, and for this reason those players still serving the market have no intention of giving up. There are now approximately 26,000 platesetters installed around the world, a mere drop in the ocean of possibilities for platesetter and consumables manufacturers.

In many ways platesetter developers and their customers are facing similar challenges. As the printing and publishing industries continue to reinvent themselves, customers who can stay the course are strengthening their positions through various means, most commonly acquisitions and mergers. They are putting commensurate pressure on their suppliers to come up with faster, more efficient ways of producing print media files, and of improving the competitiveness of their consumables. A few years ago digital plates were a small part of all plate manufacturers' production, but the ratio of digital to analogue is changing, with analogue plate production going down and digital rising. Digital plates manufacturing is central both to the day-to-day operation of the bigger consumables suppliers and their future businesses. The sands of consumables supply and demand shift almost daily and plotting a viable long term business strategy in such an environment takes cast iron commitment and steely nerves.

## Go with the Flow

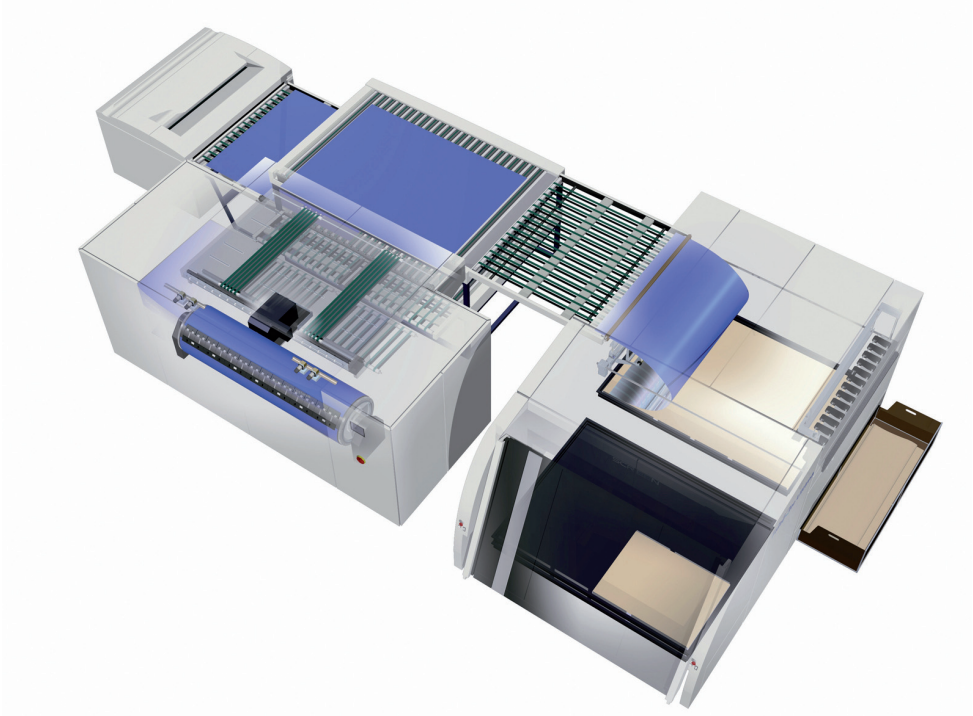
Planning an investment into CTP has to start with an analysis of the workflow, to get a clear understanding of the route files take, who is involved in their processing, how long production processes take, where and on what the files are printed, typical impositions, quality expectations and control, and overall turnaround times. Only with a complete understanding of these kinds of considerations, can the benefit of a digital platesetter be quantified. The move to a direct

to plate workflow also has a knock on effect beyond the production department. Any shift to an automated workflow based on digital data inevitably brings with it new pressures for people and possibilities for data sharing, for example with business systems. This needs to be factored into the investment planning, particularly how it will help better leverage presses and anticipated press investments.

Workflow analysis is just the start. Buyers also need to consider costs for consumables. Doing away with film also does away with the consumables associated with film-based output. But how do the costs of film and conventional platemaking consumables compare with the consumables costs for direct digital output? It's not just about the consumables, either. Consider also these costs in the context of processless platesetting. Processless and chemistry-free plates remove another link from the production chain and with it consumables and labour costs.

## Is the Price Really Right?

Of course until the market evens out, the cost of processless and chemistry-free plates is going to be higher than that of processed digital plates. However, given the enthusiasm with which manufacturers are selling processless plates, some attractive deals are possible, particularly when a new platesetter is part of the picture. Investment planning should consider the fast adoption of



***Screen's 512 channel GLV technology based Platerite Ultima 24000 (above) and Ultima 36000 are fully automated and designed with inline punching and to support new large format presses from KBA, Man Roland and Heidelberg.***

processless, and this should also be factored into to overall cost of ownership calculations. Plate prices have risen this year, but there is still considerable scope for writing creative plate contracts. This scope plays havoc with cost of ownership calculations, so it is useful to work with several versions of the same cost of ownership model, using different plate prices and throughput volumes.

**For most users the primary reason for investing in CTP is the need for production improvement. Speed, quality or both are, for most users, the primary motivation for buying a digital platesetter.**

## How do Plate Prices Vary?

At their most basic level plate prices vary with volume, and although there is considerable competitiveness locally, it is clear that all major manufacturers face the same pricing dilemmas. Not least is the cost of raw materials such as aluminium, and energy. But there are also various costs associated with account servicing and management. For each layer of management in a large corporation, money has to come from somewhere to support it, and obviously that has to be the customers. It is impossible to say how much of the price of a square metre of plate material is gobbled up in infrastructure and corporate costs, however service costs have to be included in plate price estimates. Local suppliers with reduced transportation costs may also be more competitive.

Volume production and bundled deals including service and hardware may have led to greater price competitiveness in many markets, but we are now seeing a more stable market. Increased plate prices are giving manufacturers sufficient margin for service and for research, particularly into processless plates. It's also important to remember that higher plate prices could be a means of protecting investments long term.

## Moving to Processless

Workflow analysis, evaluation of plate performance requirements and volumes, plus detailed consumables cost analysis, provide the basis for investment planning. That data might also add up to a cogent argument for going processless or chemistry-free. There are various estimates in the market as to the plate volume at which processless or chemistry-free platesetting becomes viable, and the highest figure we have heard is 8000 square metres per month. The figure could be as low as 1000 depending on the site. The higher the volume however, the greater the price latitude for potential purchasers.

## Investment Planning

Whatever plate and platesetter combination you choose, keep an open mind about financing options. Plate contracts generally require customers to purchase specific volumes, with penalties if the volumes are not met. They may be linked to a platesetter purchase

and include interesting ways of upgrading technologies. Many buyers have found this of considerable benefit.

When measuring or estimating required throughput times, remember that the laser exposure rate of the plate influences the output speed of a platesetter. Speed also varies with resolution, so compare different platesetter speeds using the same plate product to get accurate output rates. Keep in mind the fact that not all plates are accredited or qualified for all platesetters.

**One user we have heard from says that:**

***"The most impressions we have put on stochastic Azura plates is about 60,000 impressions. I was told that I would not see a gradual reduction in dot, rather the dots would start to flake off when the plate began to reach the end of its life. So far, it hasn't happened."***

It may be worthwhile including other technology upgrades in a plate contract, since many of the enabling technologies for CTP such as workflow systems, proofing engines and consumables, or processors are also changing quite fast. The rate of replacement for digital technologies is much faster than it is for analogue, so this could be a useful consideration for investment planning. Digital products used in graphics production rarely have the same life expectancy as their analogue equivalents.

2005 was in many ways an awkward year for the graphic arts. It was a year of transition, one where manufacturers faced diminishing prices, and had to cut heavily into their cost bases. It was the year when Kodak completed its acquisition of KPG and Creo, placing this mega corporation at the heart of the graphic arts. And it was the year when Agfa moved towards operational independence for its business groups, and when it started to accelerate its move into digital printing. However 2005 was also the year when processless/chemistry-free plates came into their own with over 600 users embracing Agfa's Azura, Fuji introducing its Pro-V line, Kodak making Thermal Direct a commercial reality and Presstek moving actively to supply plates qualified for imaging on non-Presstek platesetters.

We expect to see heavy interest in processless investments in the coming months, with buyers opting for machines that will provide them with suitable upgrade paths. This could be for processless platesetting, improved speed, quality or both. The changes in the market have been intense of late, however as things settle down investment will be based more and more on performance, automation and the capacity of a platesetter to leverage other capital investments, particularly presses.

# Next Generation Platesetters

**There are dozens of platesetters on the market, and this technology is constantly evolving. Following is a list of newly introduced technologies to consider:**

## Agfa

The new Avalon LF-Violet engine uses a violet version of Agfa's HD Grating Light Valve thermal head. The 60 mW violet laser diode is not configured in an array, but instead is modulated into either 360 or 512 individual imaging beams to image 1200 or 2400 dpi. It could be configured with either single or multiple diode configurations.

This is the first machine of its kind. Imaging the external drum surface means that the head can be very close to the plate surface, with light travelling the minimum distance so it maintains cohesiveness to image very sharp dots. As far as we know this is also the first machine of its kind which is switchable to thermal and vice versa with just a head change. It has the scope to image a future violet processless plate, about which Agfa has made barely a whisper. At the moment the new engine is rated for use with Lithostar and N91V violet plates.

The machine can have up to 25 plates on line and will be available in three models: 20, 30, 40+ plates per hour. The latter will be available at the beginning 2007, but the 20 and 30 page versions will be available in the autumn. This technology replaces the Galileo engines which will continue to be available until the end of the year, as an entry level machine for this range.

Both Acento and Palladio have been reengineered and Agfa expects to ship its 1000th Palladio this year. The violet imaging Palladio II has 40% speed increase and can now image 28 plates per hour at 1200 dpi. The thermal device, Acento II, has been redesigned to be more environmentally friendly with a new drum balancing system to support smaller plate sizes and a wider range of small press formats.

## Basysprint

The UV-setter 646 is a fully automated engine with two imaging heads for 6-up output. This engine images conventional plates and boasts automatic slip sheet removal and operator independent plate imaging.

## ECRM

ECRM has an updated violet imaging MAKO 2, a device ECRM claims is the world's most cost effective platesetter for press formats up to 560 x 670 mm. The resolution range is from 1200 to 3556 dpi..

The MAKO 4x  images plate formats from 228 x 252 to 660 x 960 mm at 1200 to 3556 dpi and is specifically designed for imaging processless plates.

## Fuji

The High Definition (HD) V8 HD is a B1 engine for superior output quality without productivity compromise, according to Fuji. It can image 32 plates per hour at 2400 dpi. It is based on a new high precision imaging head with an optimised laser that removes

noise in the beam profile. This results in better image reproduction, with less noise and fewer artifacts, better linearity and greater processing stability.

Tighter tolerances mean that, especially when used in conjunction with Fuji's new Brillia HD LP NV2 plate, a better dot profile is imaged for higher quality output, imaging FM screening dots with ease. When configured with its maximum of five cassettes, this platesetter can image 300 plates automatically and completely unattended. The very high quality output also provides improved on-press performance, with tighter processing latitude and greater stability overall.

The V8 HS is a twin headed B1 engine based on Fuji's traditional optics, imaging 50 plates per hour at 2400 dpi and 70 at 1200 dpi, for a 50% increase in productivity over the V9600. This high quality engine is on paper the fastest B1 machine on the market. It has a 60,000 rpm spinning mirror and twin laser optics, hence the speed. Fuji has also updated plateloading technology so this engine can produce a set of four colour plates in 3.5 minutes, including processing! Both of these new engines will image Fuji's processless plate, the Brillia ProV, when it comes out next year. ProV is good for 200,000 impressions and can hold a 1–99% screen and FM dots. This will involve a simple field upgrade to change the laser from 60mW to the required strength for imaging Pro V plates efficiently.

Both of the V8 engines were developed in the UK. The HD model will be available by June 2006 and the HS by July.

## Heidelberg

There are two new platesetters coming from Heidelberg, the A105 Suprasetter and Prosetter Performance VL. The new

## Sixteen Point Guide:

***1. Workflow*** *– Is your workflow completely digital? If not, how will you cope with analogue data?*

***2. Proofing*** *– How will you proof without film?*

***3. Money*** *– What do plates and chemistry cost? How will you pay for CTP systems: contract, lease, or outright?*

***4. Productivity*** *– How many plates do you produce and how often?*

***5. Quality*** *– What are the output resolutions and screening requirements?*

***6. Speed*** *– How many plates per hour must you produce on average?*

***7. Consumables*** *– What do you pay for plates? How many do you use?*

***8. Screening*** *– What screening capabilities can you sell?*

***9. Customers*** *– Can customers deliver digital files? Will they give you more work?*

***10. Training & Support*** *– How will you train people? Who will implement it? What support do you expect from suppliers?*

Suprasetter is based on existing Suprasetter technology and images eight to 15 plates per hour depending on size and resolution. It is for low end applications such as newcomers to CTP and the replacement 8-up market. The new Prosetter is a 60mW violet imaging engine for formats from QM46 to XL105. Heidelberg has installed 1350 Prosetters worldwide.

## Kodak

Kodak has a new 8-up CTP engine, the Magnus 800 which looks like a successor to both the Trendsetter 800 and Lotem 800. Based on exisiting Magnus technology it is available for four speeds, up to 40 pph capacity. This isn't a fair way to represent the machine's speed however since it can simultaneously process plates, each of which takes 90 seconds to pass through the system with concurrent interleave removal, imaging, punching and transport to the processor.

The Magnus 800 has Kodak's latest Squarespot 3 imaging technology and can be configured for handling plates semi automatically, automatically and with up to five cassettes for a total automated capacity of 500 plates online.

## Krause-Biagosch

The LaserStar LS 140 V is a semiautomatic VLF violet imaging platesetter for the commercial market. This new violet engine is specifically designed to image large format photopolymer plates that can be baked for long runs.

## Lüscher

Lüscher's Flexpose is based on direct laser ablation and mask ablation systems for imaging positive and negative plates. It can also engrave flexo, letterpress and dry-offset plates, flexo sleeves and rotary screens. It is the first commercially available hybrid system for imaging flexo, offset and dry-offset as well as letterpress plates.

## Sixteen Point Guide (cont.)

***11. Upgrades** – What upgrade path do you expect?*

***12. Personnel** – Can staff cope with direct digital output?*

***13. Press** – What press formats do you need plates for?*

***14. Press utilisation** – Do you have spare capacity on press? Can you fill it?*

***15. Space** – Have you got room for CTP? Is the floor solid?*

***16. IT Infrastructure** – Can servers, networks workstations and peripherals process data efficiently in your digital workflow?*

## Screen

The Platerite 6600 is an intermediate sized machine for B2+ presses. It can image plates from 304 x 370 mm to 685 x 980 mm maximum which is slightly more than B2, imaging up to 6-up impositions for new presses from Ryobi, Goss and others. There are two models, one for 18 plates per hour (pph) and another twin headed machine outputting 30 pph at 2400 dpi so it's over 50% faster than the Platerite 4300 or 8600 engines. The 6600s

image 1200, 2400, 2438 and 2500 dpi and include inline punching and automation. They will be commercially available in July.

The Platerite News 2000 is a new thermal engine for newspapers. It has a 64 channel laser diode head and outputs from 290 x 460 mm to 685 x 980 mm plates at a rate of 84 broadsheet plates per hour at resolutions of 1000, 1016, 1200 or 1270 dpi. This engine connects to any newspaper output management workflow and Screen has also developed Trueflow Rite News to drive it but details are still sketchy.

For VLF output there are two new engines based on Screen's 512 channel GLV technology, Platerite Ultima 24000 and Ultima 36000. They are fully automated and designed with inline punching and to support new large format presses from KBA, Man Roland and Heidelberg. Both can image two B1 plates simultaneously to produce a full set of punched plates for a 12 unit press in 15 minutes. The 24000 images 29 plates per hour, or 50 when imaging two B1 plates at a time.

## Tesca

Tecsa is better known as a developer and supplier of copydot scanning systems for newspapers. Recently Tecsa has started to distribute American company RIP It's violet imaging platesetters. The new Speedsetter VM4 is for 4-up output.