Variability is the law of life, and as no two faces are the same, so no two bodies are alike, and no two individuals react alike and behave alike.

– William Osler 1849 - 1919

Dear Reader,

Somewhere in between the rumours of Heidelberg and Manroland coming together, and the increasingly clear reality of high speed, high quality variable data printing, lies an important truth. On the one hand we have a sensible response to excess supply and over capacity in the printing business. On the other stands a world that really doesn't care what happens to conventional press manufacturers. That there are now more companies building digital presses than there are building conventional ones, says it all. But that's not the important truth.

The important truth is the fact that digital prepress and preproduction are now so sophisticated that static data print technology is facing obsolescence. That day is still a long way off, but advances in variable data printing technologies are happening so fast that conventional presses will eventually be redundant.

Variable data output will become the norm and no one will bother to notice variable content as something special. It will just be there, doing its job, delivering information on demand, mostly via the Internet. The need for on-demand variable output drives modern press development and neither Manroland nor Heidelberg are in a position to compete in this landscape. The rumours of merging may be false, but in truth they make considerable sense.

Enjoy!

Laurel, Nessan, Paul and Todd

In This Issue

Full Stream ahead

Laurel Brunner has been to see Kodak's Stream technology and its new Prosper press. We previewed this last year but Kodak has refined the technology and it's now delivering the kind of image quality that before was only hinted at.

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Precision marketing

Nessan Cleary asks if it is time that we retired the concept of direct mail and stopped mailing large numbers of identical leaflets to a largely indifferent audience.

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Certified – but how?

Paul Lindstrom delves under the hood of the ISO 12647 standard to find out what is actually being specified.

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In the wash

Nessan Cleary looks at some of the issues involved in de-inking paper in order to recycle it for graphic arts use, and finds some disagreements between the relevant industry associations.

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News Focus

Global Graphics has upgraded the Harlequin RIP to v8.1. This includes enhancements to the transparency performance as well as well as overall speed increases. There are improvements to the in-RIP trapping engine, TrapPro, to increase trapping performance by up to eight times thanks to more efficient use of memory. Spot colour conversion has also been fine-tuned to give increased accuracy.

InfoPrint has launched AFP support for its C900 colour cutsheet printer. This new controller allows users to run their existing applications natively for the first time, without having to go through an extra step of converting their code. AFP is a document format originally designed to support form printing on laser printers. It allows the presentation of pages containing a robust mixture of different data types.

Quark has updated its XPress layout program to version 8.1, available as a free download to users. This latest update improves PDF output capabilities with a 'Native Transparency' mode for creating PDFs for more flexible PDF output support. Quark has also tidied up many of the tools, including a new keyboard modifier that makes picture drag and drop more precise and predictable. In addition, Item Styles and Item Find/Change now fully integrate drop shadows, and users can update Item Styles with a single click to reflect changes they make in the layout. Quark has also updated CopyDesk and XPress Server to version 8.1, which now lets users choose which layers are output as a PDF. Quark has also added flash output to its Dynamic Publishing Solution.

Enfocus has released a maintenance update for its Switch 08 workflow tool which includes a new configurator supporting InDesign Server. This means that users can now use design templates to manage documents from creation until final delivery, and set up self-service and automated ad creation portals.

Meanwhile, **DMP's** FLO suite has joined Enfocus' Switch Crossroads community, bringing web-to-print, DAM and database publishing capabilities to Enfocus Switch sites. Joeri Paeleman, CEO of Digital Media Partners, commented: "Our DMP FLO web-to-print and brand-management solutions provide an ideal front-end to Enfocus' Switch automation platform." He added that DMP had already integrated Elpical and Callas software technology in version 4 of its FLO suite, as a result of joining Crossroads.

Elpical has announced a public beta for its Claro Layout, a plug-in for InDesign. This is a new optimisation tool to enhance pictures and reduce file sizes for faster, more reliable printing, from within InDesign.

Markzware has added support for QuarkXPress 8 and the Adobe CS4 suite to its FlightCheck Professional preflighting tool, and reduced the price by $100 or €70.

Callas has been quick off the mark to announce that its pdfToolbox and pdfaPilot are compatible with Apple's new Snow Leopard OS.

DirectSmile, which specialises in personalisation software, has reported double digit sales growth for the first half of 2009. DirectSmile has also opened new sales offices in Australia and Argentina. Axel Marciniak, managing director of DirectSmile, commented: "When I speak with customers they tell me that now is the best moment to invest in innovative technology to beat the recession and be in the lead once the markets take pace

again. I am expecting even better results in the second half of 2009."

Half yearly figures for **Punch Graphix nv** reveal that sales fell by 28% to €56m, from €78m for the same period last year, mainly due to a sharp downturn in demand for machines. The group's operational cash flow (EBITDA) fell over the first half from €21.5m last year to €4.9m this year. Punch Graphix blames the results on the global recession and says that it does not expect general market conditions to improve quickly.

Xerox has upgraded its DocuShare content management platform to v6.5. This can store more than 50m documents, perform search queries within seconds and support sustained intake of over one million imaged documents per day. It's available now in English, French, German and Spanish.

Xerox has also launched a new scanner, the DocuMate 742, which scans documents at 50 ppm (simplex) and 100 ipm (duplex) and includes a 100-page capacity automatic document feeder. It can scan a wide range of mixed document sizes, up to A3, and supports long document scanning up to 965 mm making it an effective way to index a large volume of mixed documents, such as medical forms or real estate contracts.

HP has announced a second beta site for its Inkjet Web Press, at Frederic Printing in Denver, Colorado, part of the Consolidated Graphics group. This installation also includes Ehret control roll unwinding and sheeting equipment from MBO. Installations at two leading book manufacturers – Courier Corporation in the United States and CPI Group in France – are scheduled to be completed by the end of 2009.

Atlantic Zeiser has introduced a new series of greyscale narrow format printer modules. The Delta 105 is available in four models covering both UV and water-based ink, and with 600dpi resolution. These are aimed at the commercial and security printing markets, as well as the labelling and packaging industries.

Fujifilm has launched an upgraded version of its thermal processless plate, the Brillia HD Pro-T2. It has a new coating which Fujifilm says will improve the plate's on-press performance and imaging latitude. This should lead to faster start-up with fewer sheets required to run-up to copy.

Presstek has won another round in its dispute with VIM Technologies with a ruling by the International Trade Commission that Presstek's patents are valid and legally enforceable within the United States. For its part, VIM has pointed out that this ruling is merely an initial determination which is subject to further review before a final determination is made.

Prism and **Responsive Solutions** have joined forces to integrate their solutions for printers and marketers. Prism sells the WIN 2009 MIS, while Responsive Solutions has Customer+, a web-to-print service which is sold as a Software as a Service (SaaS) offering.

Epson has brought out a new version of its desktop A2+ printer. The Epson Stylus Pro 3880 uses Epson's fourth generation UltraChrome K3 with Vivid Magenta pigment inks. It has a special driver mode that allows users to create bespoke black tones and clear whites. The printer contains both photo and matte black making it easy for users to switch between the two. Colours are also said to be stable after 30 minutes, and this combined with its low cost and small size makes it ideal for remote proofing.

EFI has gained FOGRA certification for validation printing for its Colorproof XF 4.0 RIP, used in combination with its own laser proof paper and a Xerox Phaser 7760. This is the first toner-based system to receive this level of certification giving users a low-cost means of producing accurate colour proofs. A validation print is a defined and reproducible quality within the creative phase. With prior agreement among all parties a validation print might be used as a colour reliable reference for production.

Datacolor, makers of the Spyder monitor colorimeter, have launched a new Spyder3Studio SR tool. This includes the new SpyderCube RAW calibration device that eliminates any need for traditional 18% grey cards, the Spyder3Elite monitor calibration tool and the new Spyder3Print SR strip reader, a new spectrocolorimeter that offers a low cost way of creating ICC printer profiles.

Congratulations to **ECRM,** which celebrates its 40th birthday this year. ECRM was founded by Professors Samuel J. Mason, William Schreiber, and Donald Troxel, all PhDs from Massachusetts Institute of Technology, and Melvin Fennell from The Associated Press, on March 28, 1969, originally as an OCR manufacturing company. In the mid 1970's, the company developed the Autokon, the first laser-based scanning camera to have broad impact on the publishing industry, and today it is a major player in the violet CTP field. The name is an acronym for Electronic Character Recognition Machinery.

News Analysis

Apple has released its latest version of the Mac OS X operating system with the launch of v10.6, better known as Snow Leopard. As the name implies this is more of an incremental update to the Leopard OS, mainly introducing radically better performance rather than a host of new features. Apple appears to have significantly altered the memory management system and the OS uses a lot less disk space than was the case with 10.5. However, it does have Exchange support, and Apple does seem to have tidied up most areas, ranging from re-organising the Preferences Pane, to tidying the Stacks feature, with all the built-in applications like Mail, Safari and iCal now written in 64-bit code.

The main significance is that this release moves the Mac into the world of 64-bit processing, thus making more efficient use of the processor, and improving overall performance. Snow Leopard only runs on Intel processors, so it also marks the end of the line for the older PowerPC processors. It also needs at least 1GB of RAM.

Moving to a 64-bit environment also affects third party developers. Many applications, including Adobe's Creative Suite have been written in the Carbon framework, which is being dropped in favour of Cocoa. There's also

a new C-based programming language, OpenCL, which can upload CPU tasks to the graphics processor, leading to greater performance providing developers take advantage of it.

Most users report that the install process runs smoothly and there are very few problems with existing software, though there may be an issue with PGP encryption. Also, Snow Leopard does not load the Rosetta layer by default which you will need for running older PowerPC software and some drivers.

Its low price of just £25 means that most people currently running Leopard are likely to upgrade to it, which will give Apple and its developers a stable platform to work from in the future. However, the license agreement is only for Leopard, so although Snow Leopard will install on those Intel machines still running Tiger, Apple expects those users to cough up £129 for a box set that also includes iLife and iWorks 09.

Did You Know?

If you read your news on the computer for more than 30 minutes you create a higher carbon footprint than reading a printed newspaper. This is according to a research report called *Screening environmental life cycle assessment of printed, web-based and tablet e-paper newspaper,* conducted by a group of researchers at the department of Sustainable Communications at the Royal Institute of Technology in Stockholm.

The group, consisting of Åsa Moberg, project leader, and Martin Johansson, Göran Finnveden and Alex Jonsson have conducted a LCA (Life Cycle Analysis) of different publishing scenarios, taking into account a whole range of factors like transport of the paper and print, and the transport of computers and monitors from manufacturer

to user as well as the energy consumption and waste. The primary focus was a European scenario, but a domestic Swedish scenario was used as well for comparison – Sweden has access to a fairly high amount of hydro electric power compared to most European counties, which influences the CO_2 impact. For example, the total CO_2 impact when reading a newspaper 30 minutes every day on the Internet for a year was found to be 6kg when using a Swedish energy mix, but estimated to be over 12kg in a European scenario.

While Åsa Moberg and her colleagues point out that there are several factors that might be complemented and adjusted, it's interesting to get samples of actual CO_2 impact of different publishing processes. So, it would appear that publishing on the Internet is not without environmental impact, and conventional print on paper publishing might still be the better choice in many scenarios.

Picture This

The picture shows the Royal Library in Stockholm, still a real library, but the question is – for how long?

This summer a debate has been raging in the Swedish press about what future the libraries have. Several representatives for the libraries have signalled that they plan to reduce the number of books, in some cases by up to 30 per cent. The destruction of unwanted books has already started.

The books that will have to go should be those that are seldom borrowed – one suggested criteria is that it should be those books that have not been lent in the last five years. The space (and money) freed up is supposed to be used to arrange events and more multimedia activities, and some of the books should only be available in digital formats.

While this seems to make sense at first glance, many authors have criticised this policy saying that the plans are ill thought through, risking losing the heritage of the libraries in the process. We might end up with our libraries becoming museums – with a few of the very old books on display as evidence of the past, replaced by cultural events and multi-media based installations and exhibitions. In fact, a group of authors have signed an open letter to protest about the plans. The authors and writers point out that the libraries traditionally have a responsibility to archive books for future research. A time frame of 5-10 years is far too short to decide if a book is unwanted or not.

The role and responsibility of the libraries has come under debate in Sweden this summer. Will they become like museums, showing only a small selection of ancient books, and hosting multimedia.

Representatives for the libraries have reacted to the strong criticism from the authors and the public about these plans, explaining that replacing older books with new ones is a natural process – it's impossible for a single library to save everything. A staggering 3000 titles are published world wide – every day!

It's quite interesting to see how strong a feeling the destruction of these books has aroused, not only among authors and writers, but also among the public. Somehow it bodes well for the future of the printed book.

A Review

The last month has seen a storm of media interest in the new technology from JPI called miracle-plate. The technology uses a new breed of ultra fast pulsed lasers that can pulse with incredible intensity in very short periods of time known as femto seconds. A femtosecond is a millionth of a nanosecond, and a nanosecond is so small as to be difficult to imagine. These lasers are unlike

analogue plate coatings when they decided to see what the effect would be on an uncoated plate. To everyone's astonishment, the UF laser switched the ink receptivity of the blank aluminium.

Thinking there had been a mistake, several different types of grained/anodised aluminium were exposed with the UF lasers and each time the ink receptivity was switched. Different wavelengths of UF laser light were used and again, the ink receptivity was switched each time. "It's a
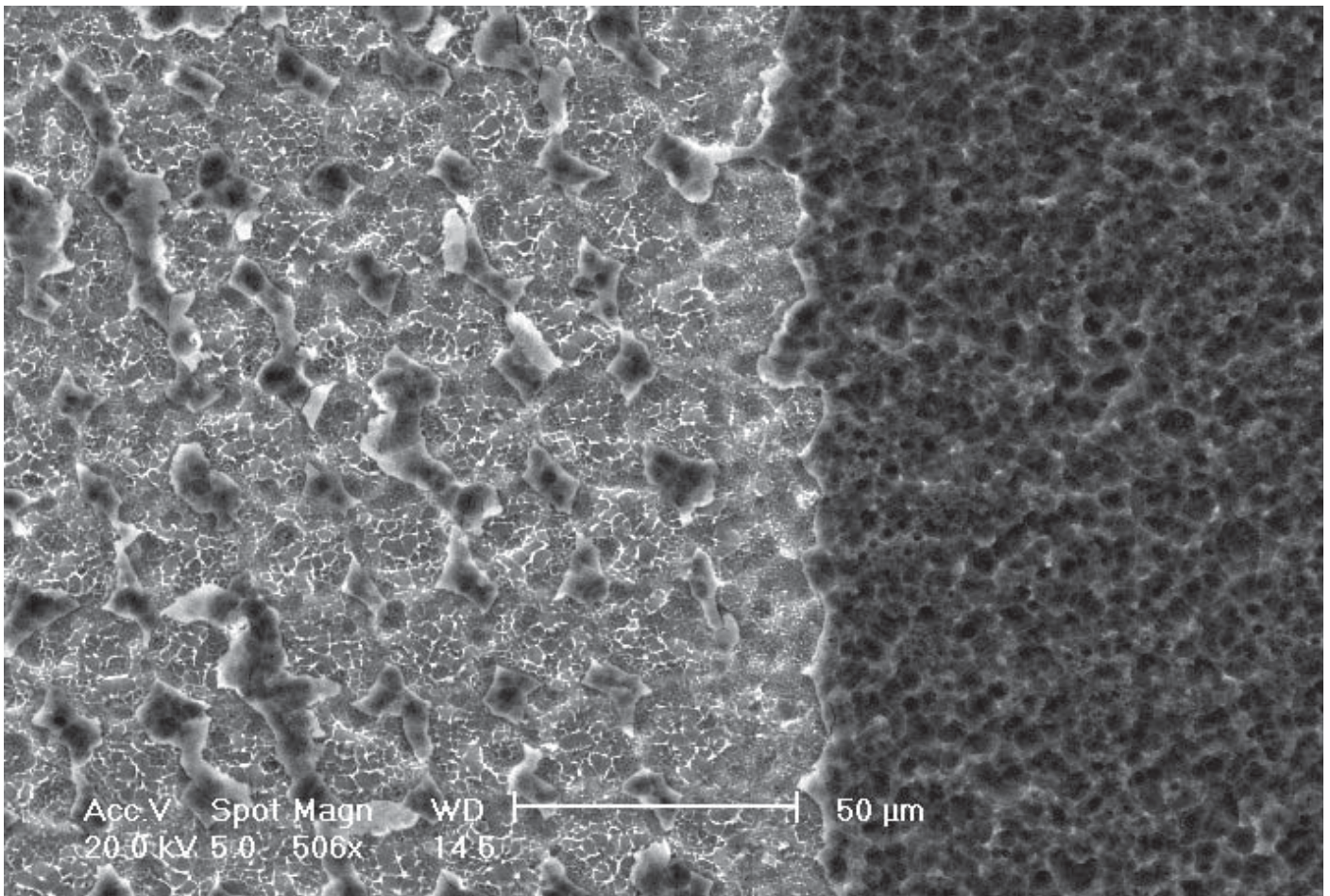
The lighter area on the left of the uncoated litho aluminium has been imaged by the femtosecond laser and the surface has changed from hydrophobic (ink receptive) to hydrophilic (water receptive). This change in state is at the cornerstone of JPI miracle technology.

anything you have imagined before and so are the affects that they have on the materials that they image.

JPI is a science company run by Dr. Rod Potts (former R&D Director for Agfa), Dr. Peter Bennett (former R&D Director for Kodak) and John Adamson (former plate manufacturing manager at DuPont). They were researching the effect of these new ultrafast (UF) pulsed lasers on thermal/

miracle," cried one of the researchers, the phrase stuck and miracle-plate technology was born.

JPI stresses that this is still just a technology and some way from becoming a product. More research is needed and JPI will probably need help to get more R&D resources. But the potential is quite significant. The initial thought process was that plate coating could be eliminated with

a 'use-once and throw away plate'. This alone would be a great environmental achievement as it would save the industry millions of litres of coating solvents, thousands of tons of coating chemicals, massive amounts of energy and eliminate the need for plate processors and process chemistry. Cost savings to the printer would be significant as 'blank' uncoated plates are well under half the price of a quality thermal plate.

But it might also be possible to use the same piece of aluminium for several print runs. The plate would need to be cleaned of ink after printing and would be re-imaged. The print industry uses some 600 million square metres each year, so if a plate could be re-used just once then that would save 300m square metres each year – but JPI has shown 4 cycles of re-imaging can be done in the lab. There would be practical challenges – how would an inked, punched/bent plate be easily cleaned and re-imaged? But the potential benefits would outweigh the obstacles and JPI is sure solutions could be found.

Moving on a stage further is the possibility of a printing cylinder. This would eliminate the problems of re-imaging a punched/bent plate. The cylinder would be grained and anodised and could be imaged either on or off-press. The cylinder would slide onto the printing roller, the job would be printed and the cylinder removed and cleaned prior to re-use. In theory a well grained and anodised cylinder might have enough durability for a lifetime of 2-3 million impressions. That could be the equivalent of 50 or more individual printing plates to the average printer.

Even at the end of its life, the cylinder could be re-grained and anodised and used again and again. Plate costs to a printer would decrease dramatically. Offset speed and quality with a fraction of the materials and a massively reduced carbon footprint. The result would be a dramatic reduction in the aluminium demand from the printing industry and a real green contribution to print.

JPI has had lots of messages of goodwill and offers of support since going public. This is one of those technologies that, if it does work according to plan, has the potential to turn the business plans of the suppliers upside down and not many technologies can do that. The major suppliers have all heard about this technology now and many have been in touch with JPI. Clearly there is a great opportunity for someone to make a genuine environmental difference with this, but it may also be unpopular as it threatens the fundamental business models of many of the large suppliers at a time when they are already under pressure.

The last technology to fundamentally change the suppliers business models happened when digital plates replaced the highly profitable film business. It is still far too early to say how the next stage of R&D will go for JPI. It now has several offers of help and is keen to find a partner that shares the environmental vision, rather than one that wants to take and bury the technology. Characterising the press performance is one of the key milestones and JPI will work with a UK print college for impartial assessment of this. Creating a platesetter which incorporates one of the new ultrafast lasers will allow them to make some rapid R&D progress and remains an important short/medium term goal. When that happens JPI will really have something to shout about.

Tony King

Driftwood

New ECI ICC profiles for web offset printing-6/2009

Paul Sherfield of the Missing Horse Consultancy has put together a brief paper on these new profiles and how they compare to the existing ISO profiles.

These new profiles, based on new datasets, replace the existing ISO Web Coated profile long thought not to represent the current light weight coated (LWC) papers used for magazines due to the 'yellow' white paper point used in the profile.
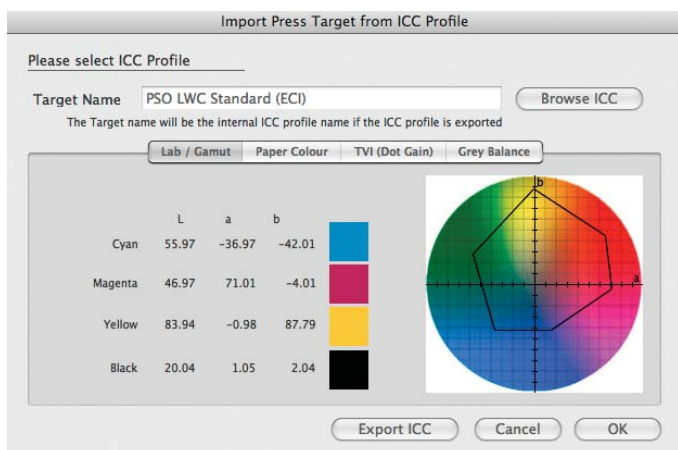
▶

This produced issues with both hard and soft proofing regarding the perceived 'background paper' tint on digital inkjet proofs and on calibrated and profiled screens.

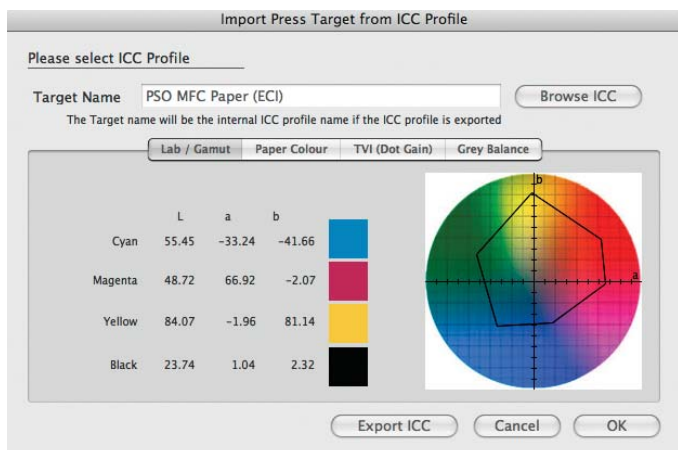Three new profiles have been released:

PSO LWC Improved eci.icc
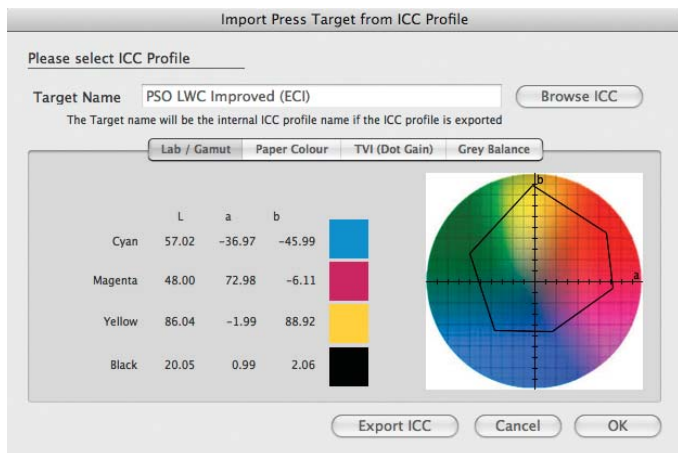
PSO LWC Standard eci.icc

PSO MFC eci.icc

This last profile being aimed at machine finished papers.

The white paper points of these profiles are:

Profile	L	a	b	TAC	Curves
PSO LWC Improved eci.icc	92.00	0.00	-2.00	300%	B & C
PSO LWC Standard eci.icc	90.00	0.00	1.00	300%	B & C
PSO MFC eci.icc	90.38	0.14	0,45	280%	B & C
ISO web coated (reference)	92.37	-0.70	1.52	300%	B & C
ISO coated v2 300	95.00	0.00	-2.00	300%	A & B

Looking at the difference between ISO web coated and the PSO LWC Improved profile there is around one De in the paper colour, moving the b area to a bluer point.

When soft proofing under controlled profiled conditions the PSO LWC Improved paper colour does look a bluer white then the ISO web offset's dirty yellow paper colour.

The gamut for the new profiles is a little larger then the ISO web offset profile, due the small change in the CMYK solid Lab values which should result in slightly higher ink densities, apart from the black which is very slightly lighter than in the ISO web offset profile, as can be seen from the images shown here on the left.

However the ISO coated v2 300 (Fogra 39) based profiles do still seem to reflect the paper white of the better 'nearly woodfree' lightweight coated papers more accurately. The main issue with these is their use of curves A and B and the 'steep' curve adjustments that can be required on some web offset presses to match these curves.

We believe GMG (and others) will be issuing these profiles for their proofing systems very shortly.

An Interview

Following Tony's excellent article and the all-round brouhaha the Miracle plate imaging technology has caused, we wanted to know even more. So Laurel Brunner interviewed Dr Rod Potts, one of the technology's developers, and began by asking him if he was aware of any similar technology to the Miracle plate under development?

Rod Potts: No we are not. The new field of ultra fast lasers is still being explored. To the best of our knowledge the miracle-plate technology is totally novel, that is one of the qualifications required to facilitate the grant of the worldwide patents that we have filed. Having said that, many of the major industry suppliers have been in touch with us since we filed the patent applications and began speaking publically about this technology. People are keen to know as much as they can about this.

LB: What interest have you had from the top three plate developers?

RP: To date, we have had interest expressed from two top plate developers. Preliminary interest has been associated with the technology (modus operandi and capability) itself and also with the Intellectual Property associated with the Miracle Plate.

LB: What is the greatest impediment to further development?

RP: Much depends on the support we can get. Work has so far been done with grants from the UK government and work with leading universities. Since we went public we have had several expressions of interest from large suppliers, and have been pleasantly surprised by the genuine interest and goodwill from some big names in the industry. JPI is a very small team and the potential for the Miracle-plate technology is bigger than we are. Realistically we will be looking to find a way to bring heavyweight R&D muscle to this from the outside. One obvious challenge would be to find a way to build a platesetter equipped with an ultrafast laser which would allow is to embark on more comprehensive and professional press testing. We have agreed to use one of the UK's leading print colleges to give us a completely impartial assessment of the press behaviour.

LB: Which sectors of the printing sector are most likely to embrace this technology?

RP: We see two or three main applications but it is perhaps too early to say how it will all pan out. One obvious application is to use the cost benefits of blank, uncoated litho plates for CTP. Blank plates can cost as low as €3/m^2, contrast that with some of the high-end thermal plates that sell for €9-10/m^2. Even if the plates are imaged once and thrown away the savings are significant, both economically and environmentally. Miracle-technology allows a plate image to be 'erased' simply by heating the plate. If the practical challenges could be addressed, then the plate could be used for several print jobs. In the lab we have re-imaged and re-printed the same piece of blank aluminium four times. More could be possible - work continues on that.

LB: How does Miracle imaging affect the recyclability of plates? Can printers expect to get a better price for them?

RP: Miracle-plate is simply grained and anodised aluminium, the industry has used this for decades, all that has changed has been the coatings placed on the aluminium. With miracle-plate technology the secret is

the novel laser imaging that switches the ink receptivity of the aluminium itself. No coating is needed and the plates are already effectively freely available as the low cost 'blanks' that people have been using for years. Recyclability should not be affected in anyway; price will be as existing standard plate products.

LB: How do you expect the market to change because of this technology?

RP: We believe that the miracle-plate technology is a breakthrough technology and that it has the potential to change the market dynamics. The entire project has been driven by the prospect of establishing a technology that has a reduced environmental impact. It is envisaged that the technology can provide a coating-free plate with fewer packaging and transport constraints, the plate will be processless and the technology has the potential to provide a re-writeable surface which could, in turn, provide a plate which could be reused several times. The potential to reuse the aluminium plate is clearly exciting and would have a significant impact on litho aluminium usage, meaning less aluminium smelting and less associated greenhouse gas emissions.

LB: How long before it could reach the market?

RP: JPI intend to bring its unique technology to commercialisation before 2012 and are considering any offers that will add value to the miracle-plate technology, or accelerate its introduction. Specifically, JPI is looking for potential partners that share the vision of making a significant environmental contribution to the printing industry. We are hopeful that both a demonstration and sample prints will be available at IPEX.

LB: Much debate has raged over the offset to digital transformation. To what extent does Miracle influence it, either to slow it down or increase it in different sectors?

RP: Good question! The downside of inkjet, for example, is the cost of the ink, the relative slowness compared to offset, and perhaps quality limitations. Imagine the quality, speed and affordability of offset printing without the cost of the plates. The concept of a re-usable printing 'sleeve/cylinder' has many attractions. You could say that

miracle-plate technology throws a spanner into the digital transformation.

Green Shoots

Researchers at *MIT, Carnegie Mellon University* and Akamai, a networking company, have found that internet businesses could reduce energy usage by up to 40 percent by re-routing data to low-cost electricity locations in the US. A routing algorithm tracks electricity price fluctuations in order to identify the cheapest processing locations.

In 2008 *Epson* collected 86.7 tonnes of used printers, scanners and projectors.

DHL Sweden is investing €800,000 over the next three years into 250 vehicles that run on alternative fuels to diesel and petrol.

The Printing Industries of America trade body has published The Green Guide for Graphic Communications: *Growing and Profiting through Sustainability*, for its members: www. printing.org/greenguide. According to playgreen.org, a green lifestyle website, an average office worker uses 0.68 kilograms (or 1.5 pounds) of paper per day.

Packaging supremos *Tetrapak* estimate that a standard dishwasher cycle generates 370 grams of CO_2 and that a return flight from Frankfurt to Barcelona produces as much carbon dioxide per person as 11,588 Tetra Recart Mini 200ml packages.

For more Green Shoots, go to **http://verdigrisproject. com**

$\mathcal{V}$erdigris

Full Stream Ahead

When Kodak's Stream technology was previewed as the Concept press at drupa last year, it was, to be honest, hard to get really gee'd up about it. The print was flat, peppered with artefacts and there was so much more tangible stuff at the show to get excited about. But this summer Kodak invited us to an intimate gathering at its facility in Dayton Ohio where Stream was developed, to show what it can really do with this technology.

Forty years after Kodak started in the inkjet business and 20 years to the day after man landed on the moon, we got a cerebral clout to remind us just how fast technology can jump forwards. According to Kodak's Dan Denofsky, one of Stream's inventors, it "is going to be transformational in the industry". And he is surely right.
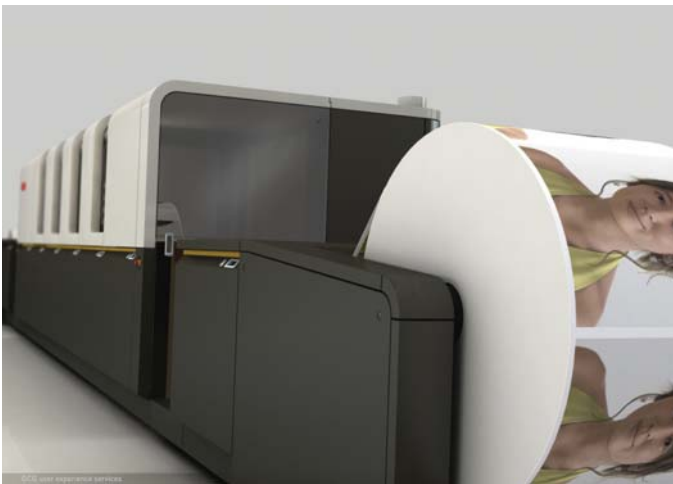
The Prosper press has come a long way from the Stream Concept Press that Kodak previewed at last year's drupa show.

Kodak plans to bring the Stream technology to market in several product groups, the first of which will be called Prosper, with the first actual product being the S10 Imprinting System for hybrid printing closely followed by the Prosper digital press, available as a basic monochrome or colour printer. Only the S10 Imprinting System is commercially available now, with the Prosper press due to start beta testing shortly.

Designed to provide the performance of conventional offset with the flexibility of digital, Stream's potential to change the traditional printing business is almost scary. Kodak's proposal is all about a printer or publisher's profit and loss options, rather than the technology. And that matters in an age where all media, from newspapers to direct mail, are having to rethink their advertising-supported business models and the cost they are paying per page impression.

The Stream Technology

But of course the technology matters, not least because it explains what makes Stream special. Stream is a continuous flow inkjet technology. Each jetting module is a single array with 600 silicon nozzles up to 600dpi across the web direction. Kodak can increase this to go to higher resolutions.

Kodak says that each Stream jetting module is good for 60 million page impressions. A thermal pulse hits the aqueous pigment ink as it leaves the head to print a variable dot size at 600dpi in a single pass, deflecting dots from the continuous ink flow using air. By changing the size and shape of the pulse, the dot size and the speed of the dropping can be varied. This is a very sophisticated version of continuous flow inkjet technology, one that is highly efficient and combines reliability, image quality, low cost per page and speed.

Stream can generate drops at a frequency of 400kHz, which should be fast enough to keep up with a conventional web offset press. And Kodak claims that it can pulse even faster. The closest competitor to the Prosper press is HP's Inkjet Web Press, which has a theoretical maximum dropping frequency of around 100kHz. Drop-on-demand inkjets generally operate at 25-40KHz.

Another of Stream's key differentiators is Kodak's new nano particle pigment ink which has micro-milled particles that help to increase colour gamut and overall quality. This ink is equally permanent on uncoated and glossy stocks and the nano particulates are less abrasive than other inkjet inks. This contributes to the overall reliability of the press, because less attrition of the nozzle surfaces means less likelihood of head failure.

Stream's aqueous inks have relatively small amounts of the humectants used in other inks. Humectants are chemicals

that retain water so they help aqueous inks stay fluid; high humectant inks are used in drop-on-demand inkjet technologies to help prevent head clogging. This means that ink droplets are laid down at very high speed yet are consistent and uniform in shape. The ink formulations can match gamuts of Gracol, SWOP, SNAP and 12647 on matt and glossy coated stocks.

The Prosper products

The Prosper S10 Imprinting System prints 600dpi monochrome variable data inline on a conventional web press or an inline finishing system at 305 metres per minute. It can be supplied with either one or two 10.5cm heads depending on whether or not it is configured for simplex or duplex imprinting. This creates a hybrid printing system that, according to Kodak, yields up to 50% lower production costs over conventional imprinting systems. This single pass technology is designed for high volume imprinters with existing web offset presses for direct mail.

Kodak also claims that the overall cost of operation is 60% better than using a laser-based system to imprint variable data onto preprinted shells, based on the S10's speed and consumables costs. This however is more informed supposition than proven fact. Until the S10 Imprinting System has been in the field for a while, there is insufficient evidence to support these productivity claims.

The S10 is running at four beta sites in the US, UK, China and Germany, all producing direct mail pieces and working with Müller Martini forms presses. Production has exceeded 90 million impressions so far. Kodak has announced that the first commercial sale will be to Instant Data Forms in Shenzien, Hong Kong, one of China's leading providers of general business forms and direct mail printing services. Tommy Leung, President of Instant Data Forms says the S10 "will help me bring more value to my customer … it can also help us expand into other applications."

The digital press

The Prosper Press, which Kodak showed at drupa as the Stream Concept Press, is an elegant beast with a surprisingly small footprint. It is the beginning of a family

and is designed for data centres and traditional offset sites. It's available either as the Prosper Black Press or as the Prosper Color XL, in both simplex and duplex versions.

The monochrome Prosper Black Press images a 622.3mm width using one or two print arrays to print 600 dpi in simplex or duplex mode at 100–133 lpi onto 45–175gsm gloss coated and uncoated stocks. It runs at up to 3600 A4 sheets per minute and has a duty cycle of 120m A4s per

Dan Denofsky, director of future products for Kodak and one of the people behind the Stream technology.

month, to provide high productivity for printing eight, 12 and 16-page signatures, for book and direct mail printing. Kodak is basing this duty cycle on 24/7 operation and an uptime of 80%.

The paper path is designed to fully exploit the speed of the head/imaging technology. The drying architecture (NIR – Near Infra Red) and paper handling are both optimised for a high range of paper types and surface finishes. Kodak is working with US paper manufacturers to develop a line of papers for its Stream implementations, including coated and uncoated stocks.

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The Prosper Color XL for printing books, direct mail, catalogues and inserts can print full colour at 600 dpi and 133–175 line screens on substrates from 45–300 gsm, including gloss coated and uncoated stocks. This press is suitable for a range of applications however Kodak is initially focusing on the commercial market.

The Prosper Black Press will be fully available early next year, primarily for the book market, with Prosper Color XL installations due to begin in Q2 2010. Webcrafters Inc, a leading US book printer has signed the first letter of intent to purchase a Prosper Color XL Press.

Kodak is working with partners for finishing options and to develop its OEM channel. It is also looking to work with partners for a larger format machine.

There's a new 700 Digital Front End, which will provide the cornerstone for managing both the Versamark and Prosper printers.

System Controllers

Kodak has developed the CS410 System Controller to drive the S10 in hybrid printing applications, which is similar to the controller currently used by D-Series printheads. Customers can field upgrade to the CS410 for better performance.

Kodak also has a new 700 Digital Front End. This is a single controller based on a custom version of the Kodak (Creo) Fusion board, plus blade servers. Fusion assembles pages

at printer-rated speeds, imposing them on the fly. The 700 blends Kodak's experience with both conventional offset workflows with the efficiency and experience gained serving the data centre environment. Kodak's manager of applied workflow solutions, Terry Wozniak, says it is built based on the OHIO workflow philosophy: Only Handle It Once.

Kodak has also worked closely with partners such as XMPie, GMC, Emtex, Sefas, PrintSoft and Agfa for interfaces between their workflows systems and the 700. Connectivity to other printers and prepress systems is via Prinergy, which also provides a portal for load balancing across systems, with JDF/JMF another means of connection to other workflows. The 700 DFE, which also powers the Versamark VL range, is a scaleable architecture and should provide the foundation for driving Kodak's future inkjet presses. Rotomail, one of Kodak's Versamark customers, was the first customer in Europe to beta test the 700 Print Manager, which is now ready for commercial release.

The 700 DFE supports multiple PDLs including PDF 1.7 and PDF/X-3, EPS, Postscript Level 3, plus PPML/GA, PPML/VDX and VPS for variable data output. Version 2.0 will add IPDS support by the end of this year, and next year Version 2.1 will add direct consumption of AFP and VIPP input (Variable data Intelligent PostScript Printware – an open language created by Xerox for sending variable data Postscript files to digital engines). Support for PDF/VT is in development and expected to be in version 3 later next year.

The 700 provides concurrent job processing and data streaming so the press runs while a long job is still processing. It has advanced colour management controls, including output emulation for different colour sets. This is based on device profiles so it can support SWOP, Gracol, 12647 and anything else required, to match offset values on digital devices and ensure consistent and accurate output.

Object independent screening and colour processing, plus colour control for all colour sources and output devices are all part of the 700's remit. Kodak expects connection to ColorFlow via Prinergy in the future, for managing colour across workflows and output paths.

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Cost of Ownership

Perhaps the most compelling argument for Stream is its cost, both in terms of consumables and low maintenance. Stream's thermal pulsing technique doesn't wear the heads, unlike drop-on-demand thermal expansion. Depending on configuration, a Prosper press costs between one and four million US dollars.

The ink cost is low as are the jetting module costs based on their long life, and consumables can be purchased as part of a click charge, through a service contract or as needed. A single jetting module is apparently good for up to 20 million A4s, independent of coverage and Kodak claim that a single A4 page with around 35% CMYK coverage costs less than 0.8 cents. Kodak includes consumable parts and service in this calculation as well as ink and paper.

Kodak also claims other economic benefits. Automation means low set-up costs and efficient job data tracking provides the basis of flexible business models and upgrade paths for customers.

Kodak's Stream sits between electronic printing where Kodak estimate page costs range from $.01 and $.10 and offset at between $0.001 to $0.01. The two markets represent 1,500 billion and 77,000 billion pages respectively, and in between the two is the market for Stream. This versioning, variable data, zoning and personalisation business is huge. Its per page costs straddle electronic printing and offset. Per page prices for digital print can be anywhere from four times more than offset and up, depending on the run length, production speed and quality. But the value of a fully variable page and per page data ROI can be very high indeed. Stream's low cost of ownership and modular upgrade path, leverage the assumption that it is numbers like these, rather than technology alone, that drives offset to digital transitions.

Conclusions

What Kodak has achieved has the potential to devastate the conventional printing press business. Is that a touch overdramatic? Possibly, but given advances in digital printing compared to those of conventional press technologies, then it seems that conventional press innovation and manufacture belong in the last century.

As sophisticated and amazing as it is, the technology is mature. Its markets suffer from chronic over-capacity and in too many regions those markets are in self-destruct mode, competing on price, entrenched and slowly suffocating with business models out of step with digital communications channels.

The S10 Imprinting System is designed to be used in hybrid set-ups, either on an offset press or finishing line, for adding personalised details to litho printed documents.

There are too many press manufacturers still trying to capture an unstable static data market that is under threat from the digital arrivistes. For the last couple of years, the only real growth for the likes of Heidelberg, Manroland, Goss et al has been in export markets. In contrast the digital printing industry is exploding, with new installations and applications proliferating with each turn of the innovations screw.

Sitting in between the two, Kodak is well placed to convert its traditional and digital customer bases to Stream. With

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over 10,000 computer-to-plate installations, there are plenty of candidates for a digital press of some description, which should provide a tidy replacement income for when plate sales start to fall. Well-placed and well resourced, Kodak's only real vulnerability lies in how it chooses to bring Prosper to market, especially beyond the USA.

Kodak plans to serve all markets from the US, a decision that could undermine efforts to get this technology into the field. The world works locally and in choosing to place Prosper at arm's length from the frontline, Kodak risks polluting the credibility of this amazing technology. It suggests that Stream is too fragile to risk remote sales and support. Maybe this is true, but what's more likely is that the marketing, sales and support investment is simply too high at this stage in Prosper's development. We hope that's not the case.

– Laurel Brunner

Precision marketing

New technology is allowing marketing professionals to tailor much more efficiently the way that they communicate with their customers and this is affecting the traditional business model for direct mail printing.

The past 15 years or so have seen big changes in the way that mass media communication works, with the widespread use of mobile phones, email and the Internet, not to mention digital printing and on-demand television. Yet, direct mail remains a stubbornly old-fashioned way of getting a message across, one that relies on blasting thousands of copies of a printed document out to all and sundry and then counts a three per cent response as a success.

Patrick Headley, sales director at GI Direct.

The advent of variable data printing should have put an end to this long ago, but it has taken a long time for marketing agencies to build up the databases of people's preferences that are necessary to take advantage of personalised printing. But thanks to better use of billing information and supermarket loyalty card schemes, many companies are now able to make the accurate profiles of their customers that are necessary in the production of highly relevant, personalised mailings.

And that of course is starting to challenge the traditional direct mail business model, as Patrick Headley, sales director at direct mail specialist GI Direct, explains: "We are doing less and less of long run anonymous direct mail. Many companies now are vastly reducing their media inserts and so on and instead they are sending more targeted mailings out. People are segmenting more so they are not just sending out a vanilla offering to everybody, they are segmenting them into groups, and overlaying things like geo-demographic profiling. If you can send details of a product that's more likely to appeal to the person then you are more likely to get them on the hook."

Phil Westoby, a director at Mailcom, agrees with this saying: "The market for direct mail has fallen off but we see customers moving acquisition now into other channels like digital printing and making use of a phone to acquire new customers or up sales to existing customers." He goes on to say that direct mailing is more likely to be part of an integrated campaign now: "We will acquire customers through the phone and then also do mailing activity and also do email so the budget tends to be split across various channels."

The exact mix of those channels depends very much on the product, and particularly the age group that is being targeted, as Mario Krajniewski, managing director of Griffin Direct, points out: "The younger generation want to be seen to be a lot more focussed on the Internet and the phones, whereas the older generation still like the paper handled documents, so they can file it and keep it the way that they like it. They do like to see the postman deliver the mail."

Full service

This has led to a new breed of direct mailers, who are more comfortable with computing and data management than they are with printing. This includes companies such as Mailcom, as Westoby explains: "We're a personalisation and data environment company, so the ink that we put on paper is only personalised ink. We are not a printer."

Simon Illingworth, product line manager for Pitney Bowes, says that digital printing is reshaping the direct mail business: "And particularly now the move to colour is driving the ability to be that bit more intelligent around the composition of the document because you are not printing 100,000 copies of the same thing now, but a very personalised document."

Westoby explains: "What happens in the colour environment now is that you are tending to get just white paper solutions so you just get white paper in and it's a complete personalised colour that comes out the other end." He adds: "If it's mono personalisation we will get some preprint that's got some colour elements on it like a logo and then we will put all the black text and the personalisation onto the colour paper."

However, improvements in colour digital presses mean that the idea of preprinting some of the information on a litho press may soon be a thing of the past. Martin Viquerat, account development director for marketing agency CDMS, says: "We've also found that when you have short run regular applications, where the volumes rise or fall, for example with the seasons, we've been able to take those applications away from preprint into four colour digital. So although you are not varying every page, you are replicating what was a litho preprinted stock and that allows the customer to vary it frequently but also saves a lot on wastage. There's no additional setups or logistics so you can pass those savings back to the customer."

He adds that companies like CDMS are looking at the new high speed inkjet printers with interest: "I think the Kodak Stream technology is going to be revolutionary because the quality at speed that comes off that is going to have a significant impact on the market, and will be the death of a litho forms press."

Making greater use of high speed printers such as the Kodak Prosper press or the HP Inkjet Web Press will also affect the finishing. At the moment, most direct mail finishing is done offline because it usually requires some extra level of creativity, such as an unusual type of folding and perhaps some gluing. But transactional, and by extension transpromo work, are usually finished inline with the printing.

In this case the creativity comes from the printing, with the only finishing being a standard fold, and perhaps perforating a giro payment form or voucher. It's then simply a matter of inserting the finished document into an envelope, making it much easier to get the right documents collated together with the right address. And this is an important part of helping to keep the costs down.
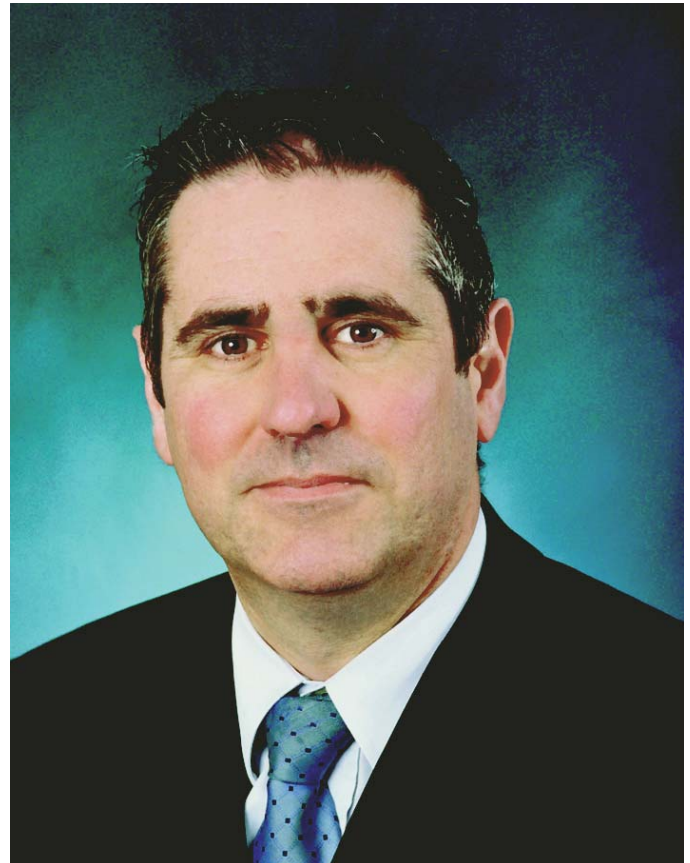
Martin Viquerat, account development director for CDMS.

Direct mail and transpromo

It's easy to confuse transpromo with direct mail, but in reality the two are very different. Direct mail is really just a numbers game, but as Viquerat explains: "The transpromo is taking offers that would otherwise have been inserted in the statement as leaflets, taking those and printing them as part of the digital print room on the back of the statement summary page. So there are two issues there, because the targeting can be more specific and there's not as much wastage in the pre-purchasing of leaflets that may end up not being used."

He continues: "Also the speed, because the customer can decide on a Friday afternoon what images or offers they

want to put on the statement for the coming weekend, whereas with preprint there's a lead time of a number of weeks. And because it's on the back of a statement it's got a longer shelf life so you get a number of iterations of the customer viewing the offer before they make the payment on the statement, and because it's targeted based on what we know about that customer then it's got real impact."

Simon Illingworth, product line manager for Pitney Bowes DMT International.

According to Illingworth, transpromo is best suited to cross selling from one brand to another in the same stable. He explains: "I believe that the uptake in internal cross sell tends to be very good and I think that is because in most cases if you are doing a cross sell between different lines of business within a large organisation then normally they have a lot of data about you and so they can be very specific about what you are likely to be interested in. So those sort of campaigns where you are cross selling can be very powerful. If you are an existing customer then it's entirely possibly you may be receiving a statement or an invoice already so embedding cross selling promotional activity onto it, which is very focussed and targeted on the recipient, you tend to find that the return rates are higher."

Richard Higginbotham, marketing manager at CDMS, says that it would be foolish not to make better use of transpromo as a marketing tool: "You've got a huge

competitive advantage – you know who that consumer is, what they want and when they are likely to shop so you can avoid wasting their time whereas your competitors only know their name and address. If you don't act on that competitive advantage then you almost deserve to lose that customer."

But as Illingworth points out, transpromo only works with those customers that a company is already dealing with. He says: "Direct mail remains a viable way of communicating with people that you haven't communicated with before, or only had a small amount of communication with, certainly people who you are prospecting rather than people who you already know."

In conclusion, it's worth pointing out that the other dynamic that is driving this change is that marketing agencies are all too keenly aware that the public are becoming increasingly more aware of environmental issues and the waste involved in what is seen as junk mail.

In the future we are likely to see a lot more transpromotional messages on our statements, and a lot less direct mail coming through the letterbox. But this is more than just a matter of printers buying into digital to tap into this market. Rather we are likely to see specialists competing on having the necessary knowledge of how to handle databases, rather than simply competing on price and that is likely to benefit the industry as a whole.

– Nessan Cleary

Certified – but how?

We have repeatedly written about quality assurance in Spindrift, not least about print certification according to the ISO standard 12647. But what criteria are in this standard, what is it that's actually measured? In this article we will describe the core elements of the standard, so that ad agencies, publishers and other print buyers have a better idea of what they are getting when buying print from a certified printing company.

The ISO 12647 standard describes several types of print production. Perhaps the best known of these is 12647-2, which covers high quality offset print – both sheetfed offset and heatset web offset. Newsprint – web offset on lower grade paper has its own category, the 12647-3 standard. Gravure, flexo and screen have their own sections, but digital printing still lacks an ISO standard of its own.

producing the colours on paper specified in the standards. For all the printing methods in the 12647 series this means CMYK – there is no standardisation of special colours/spot colours (DIC, Focoltone, HKS, Pantone, Toyo et cetera).

What is specified?

Basically a printer needs to control the printed result so that on a given paper, the solid areas for cyan, magenta, yellow and key, or black, reach a given value expressed in CIE Lab. There are recommendations for what the CIE Lab values should be for the secondary colours, that is when CMY is mixed, creating Red, Green and Blue. But this is actually outside the 'must be' values. Equally there are no absolute values for skin tones or orange, or even greyscales.

Instead the control of the dot gain is meant to give a reasonable control of all the colours between paper white and solid CMYK. It's impossible to give aim values for all the paper types on the market, so in the ISO standard a selection of five paper types is made. For those five paper types, values for paper colour are specified (in CIE Lab),

When validating print according to the ISO 12647 standard it's really only a few colour patches that are specified with 'must be' aim values, given in CIE Lab. The old Ugra/FOGRA Mediawedge will suffice, since it contains colour patches for the primaries CMYK.

This is mainly because almost every digital printing technology uses its own ink sets, so it's said to be very difficult to agree on common aim values regarding the colour values for the primaries used, typically CMYK. While waiting for a dedicated ISO standard for digital printing, if it ever appears, many digital printers learn how to print according to the tolerances of ISO 12647-2, high quality offset, or possibly 12647-7, which is the standard for contract proofing, with tighter tolerances. Alternatively, a third option is to refer to the 12647-8 standard which covers validation proofs, with slightly more generous tolerances than, for example, colour laser printers should be able to meet.

So, printing according to a specified ISO standard means that you control the complete process involved in

as well as values for gloss, brightness and mass-per-area. But again, only the aim values for paper colour and gloss are 'must be' (or 'normative' in the language of ISO standards) – the values for brightness and mass are only recommendation (or 'informative' in the language if ISO standards).

Finally the print standards give values for repeatability, including deviation and variation. This means we need to measure and control how big a percentage of the volume is within the specified tolerances. It's not reasonable to expect that every single printed sheet or copy can or will be measured so here we have to delve into statistics. By measuring a large enough number of samples during the print run, the printer can then estimate if a large enough percentage of the prints are within tolerances. The ISO

standard 12647-2, for example, stipulates that at least 68% of the delivered copies should be within the tolerances given. This might seem low, but is estimated to be the volume possible to guarantee with a sample frequency that is reasonable to maintain in daily production, without slowing down the printing process.

How to measure?

Most modern presses are equipped with a sophisticated colour control system, capable of achieving the stipulated aim values for the colours CMYK. Since these are expressed as CIE Lab, it's necessary, at some point, to use a spectrophotometer. A densitometer can't measure the true colour of, for example, Cyan, only how much of what is supposed to be Cyan that is printed. But once the printing process is checked to conform to, for example, ISO 12647-2 on a certain paper type, the press operator can translate the given CIE Lab value to the corresponding density value for that colour.

It's sometimes stated that a press operator needs to use a spectrophotometer on the press in order to print according to a given ISO standard, but that is not entirely true – there are ways around this. In other words – printers can't excuse themselves for not being able to print according to ISO standards because they can't afford to buy a new press or press control system. A handheld spectrophotometer should be enough to maintain the quality management.

Besides the state-of-the-art press control systems there are a range of standalone control software to evaluate and validate the printed result, to check if the print is within ISO 12647 tolerances. Among the better known of these is the X-Rite ProfileMaker, which can read the popular UGRA/FOGRA Mediawedge (a control strip containing all the control bars needed to validate ISO 12647 printing). But there are other, perhaps lesser-known tools, in different price brackets such as PrintSpec from UK-based Mellow Colour, Alwan Print Standardizer from Alwan, or different options from the US-based Babel Color.

Most professional proofing systems have a built-in function to validate a contract proof against the ISO 12647-7 standard. There are even share-ware programs that make a reasonable job here, such as ValiProof programmed by Martin Weberg, a former student at Malmo University department of Graphic Arts. ValiProof can read any standardised test form containing the data that you need for ISO 12647-based printing, and compare the measured values with that which FOGRA has published as normalized aim values on its website.

In reality most printers that want to conform to the ISO print standard need to define and use a generally accepted ICC profile, like for example those in the Adobe Creative suite. For printing on coated paper this means using the so called FOGRA 39 colour characterisation data set, which is possible to download for free from the FOGRA website.
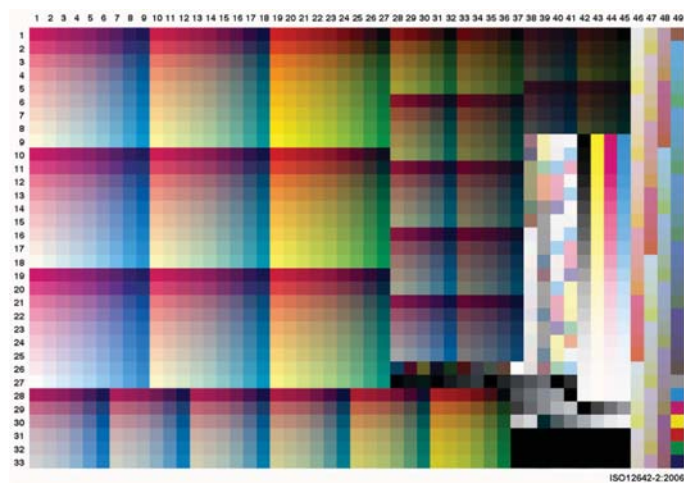
In practice all well-known reference ICC profiles used in ISO-compliant processes are based on a large number of reference colour values, like the new IT8.7/4 test chart containing 1617 colour patches, which is becoming popular especially within packaging printing.

So, any printer that wants to check if they can print according to ISO 12647-2 can't really claim that it needs to be too expensive. Coming back to the shareware ValiProof, all that is needed is to print, for example, an IT8.7/4 test chart, and compare the result with the (free) reference data from FOGRA. Martin Weberg has placed his software under an Open Source license, and anyone interested can download the beta version (in both Windows and Mac OSX version) from Sourceforge.net.

It's about time that both printers and publishers agree on specified terms for quality management, in order to reduce errors and waste, including the time wasted on deciding what file formats to use whether or not proofs and print meet demands regarding the colours. ISO standards such

ValiProof

Proofing data (IT8.7/4)

Processkontroll–CiPF9000S–Bestr–0

[Open...]

Reference data (IT8.7/4)

FOGRA39L.txt

[Open...]

Compare data

[Compare]   [Table...]

Descriptive statistics

	ΔE76	ΔE00
Samples	1617.0	1617.0
Mean	1.12	0.72
Median	0.99	0.63
Std. deviation	0.68	0.44
Minimum	0.05	0.04
Maximum	5.53	3.59
90th percentil	1.95	1.24
Skewness	1.88	1.98
Kurtosis	6.18	6.73

Fogra media wedge v3

Criteria	Difference (ΔE76)	Tolerance	Status
Paper simulation	0.9	3.0	Passed
Mean of all fields	1.3	3.0	Passed
Max of all fields	4.8	6.0	Passed
Max of primary colors	1.4	5.0	Passed
Max ΔH of primary colors	0.9 ΔH	2.5	Passed
Mean ΔH of composed grey fields	0.4 ΔH	1.5	Passed

IDEAlliance hard copy proofing

Criteria	Difference (ΔE76)	Tolerance	Status
Average of all	1.1	1.5	Passed
95th percentil	2.3	6.0	Passed
Cyan	1.4	5.0	Passed
Magenta	1.3	5.0	Passed
Yellow	1.4	5.0	Passed
Red	2.0	5.0	Passed
Green	1.1	5.0	Passed
Blue	0.6	5.0	Passed
50/40/40 grey	0.6	1.5	Passed
Paper white L*	0.8	2.0	Passed
Paper white a*	0.1	1.0	Passed
Paper white b*	0.3	2.0	Passed

Only having a small budget is not a good enough reason for a printer not to print according to ISO-standards. The ValiProof software is a shareware program developed by Martin Weberg, a former student at Malmo University, which does a decent job when checking print for ISO compliance.

as PDF/X for the files, and ISO 12647 for print, should be understood and used to a much greater extent than at present. As we have shown here, it's not that difficult or expensive to obtain the knowledge, technology or software needed to apply it.

– Paul Lindström

In the wash

De-inking used paper is a major step towards making recycled paper, but can established de-inking processes keep up with advances in printing technology?

There is a generally accepted principle that it is better to recycle as much paper as we can, rather than cutting down trees to make paper from virgin fibres. Recycled paper can be put to many uses, including tissue paper and cardboard. But contaminants within the mass of paper to be recycled, including the inks that have been used on it, can cause the resultant recycled paper to be discoloured or grey. Such paper is not really suitable for graphic arts use, where there is a preference for a white appearance. One obvious solution is to bleach the paper white, but there is a trend against bleaching, which is not seen as the most environmentally friendly option.

A better solution is to de-ink the paper first, removing as many of the contaminants as possible to get a paper pulp clear enough to produce white paper suitable for graphic arts use. There are two established methods for de-inking paper, known as washing and flotation. De-inking by washing involves mixing the paper in a pulper to produce a slurry. From this, waste objects such as staples are filtered out, and then the water, together with most of the ink, is drained away, leaving the paper fibres which may be rinsed again. This method can be very effective at recovering paper fibre, but uses lots of water, which then needs to be treated, somewhat undermining the environmental benefits of recycling the paper.

Flotation Devices

For this reason, most recycling plants in Europe use the flotation method, which, Andy Gordon, operations manager for Aylesford Newsprint's fibre preparation plant in the UK, says is optimised for offset inks, which nowadays use mineral oils. Gordon says: "In the deinking process we add a simple sodium soap prior to injecting the 'pulp' into a flotation deinking cell. The conditions must be alkaline and the presence of plenty of calcium ions is essential. It is also important for the pulp to be in the range of 45°C to 55°C. The consistency of the pulp at this stage is very important, it must be between one and two percent. The hydrocarbon chain of the soap molecule is hydrophobic and is attracted to the mineral oil which is a hydrocarbon and therefore also hydrophobic. The calcium ions attract the other charged part of the soap molecule and cause the ink/soap particles to agglomerate and get larger. When the pulp is injected into the flotation cell the injectors are designed to pull in air and mix it with the pulp. The resulting air bubbles pick up the calcium/soap/ink agglomerated particles and float them to the surface. The inky scum that results is overflowed into a trough and the 'deinked' pulp is fed on to further processes."

The de-inking cells and giro cleaners at the Aylesford Newsprinters in the UK, which produces recycled newspaper stock.

A single loop ought to be enough in theory, but in practice just about all mills use a two-loop process because the paper sent for recycling is often contaminated with other materials, such as staples, sticky labels and plastics. Each loop involves several separate stages, as Nils Miller, HP's senior scientist for inkjet R&D and environmental strategies, explains: "A two-loop process means that after the initial pulping and screening and cleaning stage, that you have a flotation stage, and after that first flotation stage which is a multistep process, you then go through a very high sheer device that chops up whatever contaminants you have in there and ideally chops them up in a small enough size that they can then be effectively removed during the second loop of flotation de-inking. This could be chunks of toner, dirt specs, it depends on what's coming in on the recovered paper side of the mill. But that two loop process is designed to treat the real world paper streams of today."

The deinking process itself produces a waste sludge consisting mainly of paper fibres, ink and some fillers such as aluminium oxide. Most paper mills burn this residue as part of their own power generation. It's also used in cement production where its aluminium content compensates for poorer quality clay, and in making bricks, where the fibres are burned when the bricks are fired in a kiln, leaving micropores which can increase the insulation and stability of the bricks.

Different standards

When it comes to standards for de-inking, most companies refer to those set by Ingede, a German trade body (Internationale Forschungsgemeinschaft Deinking-technik, the International Association of De-inking Technology) set up in 1989. Ingede includes most European paper manufacturers and brings together paper manufacturers, ink developers and digital printer vendors. Together they ensure cooperation in the production of printed matter that can be de-inked for future recycling.

The air bubbles used in the fl otation process can clearly be seen here in this image from Aylesford Newsprint.

Four companies developing inkjet presses - HP, Océ, Kodak and InfoPrint Solutions - have joined together as the Digital Print De-inking Alliance (DPDA) to support research into recycling inkjet-printed paper. In public, Ingede has welcomed this move, though in private it fears that the DPDA's main aim is to call Ingede's methods into question.

Although the need to recycle paper is becoming accepted around the world, not everyone has the same environmental standards. As a general rule, de-inking standards appear to be higher in Europe where a lot more printing and writing grades are produced from recovered paper. Axel Fischer, press officer for Ingede, says: "We have about the same volume of paper being collected in Europe and the US – both have about 50m tonnes per year – but in Europe more than 50 per cent goes into printing and writing grades and in the US it's around 20 per cent or so."

He continues: "In the US they produce more packaging and they export more paper to Asia. In Europe all our newsprint is produced from recovered paper and that's not the case in the US, and so we have a far more advanced system than in the US, where there are only a few mills that produce at the same high level."

Fischer says that there are lots of joint ventures and cooperations in Asia: "In China, for instance, the mills that have been set up there within the last five years are all working with European standards because the engineering companies are the same as in Europe, through joint ventures with people like Stora Enso or UPM. And the same is true of Australia."

What can be de-inked?

Ingede carries out its own tests on different printing processes and issues certificates to vendors. It also co-ordinates research on printing and de-inking technologies and encourages the development of systems for collecting material to be recycled, as well as better awareness amongst consumers of the need to separate papers for recycling from other material.

The bulk of the papers that are being recycled to make graphic arts papers are those that were originally printed via offset litho and Fischer says that the flotation deinking process can cope well with this: "When you de-ink offset the ink breaks into particles which consist of binders and pigment and these particles are very small, but they are still hydrophobic. The oil-based ink goes into the foam and the fibres which are water-loving stay in the water, so you separate the oil-based from the water-based part." However, according to Fischer UV and UV offset inks aren't so easy to de-ink cleanly.

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Fischer also says that dry toners are deinkable in a single loop: "We have no issues with dry toner. Dry toners happen to break apart in the right size and they happen to be hydrophobic so they are even better than standard offset in the de-inking process. Some experimental systems showed deviation but everything which is currently on the market, especially the high speed machines, from Xerox, Nexpress, Océ and so on are all perfectly deinkable."

Axel Fischer, press officer for Ingede.

Problems with Indigo and Inkjet

However, Ingede is embroiled in a long running argument with HP over the Indigo Electro-inks, which Ingede claims are harder to de-ink than they should be. Fischer explains: "We tested the Electro-ink version 4.0 and, compared with dry toner machines from Xerox and Océ, there was a factor of at least 35 in terms of dirt specs from the HP Indigo."

According to HP, the Ingede method 11 test is a highly simulated piece of data from lab tests not taken directly from the real world. Miller explains: "The two-loop process is designed to treat the real world paper streams of today. But the Ingede method 11 makes no attempt to simulate two-loop processing. Instead it treats things as if there were no intermediate chopping up or dispurging stage and so they focus on simulating a one loop deinking flotation."

But Fischer says that this second loop, the grinder or dispurger, is the highest consumer of energy in the entire system and is the highest cause for the loss of fibre in the whole recycling process. "No matter which way you look at it, everything which challenges this kind of equipment increases the carbon footprint and the energy needed to recover the paper for recycling so it's definitely something that we would not want in the system and we would not call it a good deinkable or recyclable for higher grade papers," he says.

The argument hinges around the amount of paper sent for recycling that has originated from an Indigo press, and here HP has a reasonable argument, that its Indigo printers represent a fairly small section of the market, and the existing two-loop flotation system can cope with this. However, there is potentially a much bigger problem with the high speed inkjet printers which were demonstrated at the last Drupa show, and which are expected to be commercially available in time for the next IPEX show. These could potentially challenge offset presses and take a much larger slice of the market than digital printers currently do, as Tim Taylor, marketing manager for Screen Europe, explains: "I don't think that anyone would doubt in years to come that there would be B1 inkjet presses eventually and they will then compete directly with offset, if not actually replace offset over a period of time."

Fischer likens de-inking water-based inks to having a red sock in the washing machine: "If you put something in the system and it's water-based it dissolves. We have closed water loops in all of the mills so the main difference between a washing machine and a paper mill is that in a washing machine you change the water but still you get pink underwear when you have a red sock in it. In the paper recycling mill the water-based inks accumulate in the system and the only exit is the fibres, which reduces the brightness of your final product. Offset inks are hydrophobic so it's not a problem."

But it will be some years before these inkjet printers start to take a serious chunk of the market, and for now these vendors argue that water-based inks have an insignificant impact on the recycling process. However, Fischer says that the biggest problem comes from direct mail because there is a very short interval between the mailshot being

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sent out and ending up in the recycling plant. "It comes like a wave to the paper mill and you cannot say that in average it is a low percentage because in that one week you have a higher load." He adds: "The German automobile association is an example, because they have over 20 million members and they regularly produce direct mail advertising, say, their insurance, but imagine having 20 million four-page, four-colour leaflets printed in inkjet or on an Indigo – you would really see that in the mills."
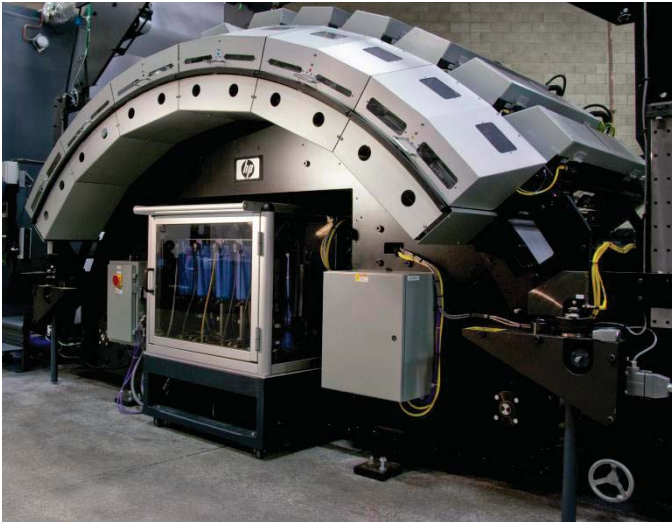
HP's giant Inkjet Web Press uses a bonding agent to help the ink stick to the paper, but this also helps to make it easier to deink for recycling.

And this is an issue that we should deal with sooner rather than later, as Michael Has, director of marketing and software strategy at Océ, says: "The paper recycling companies are very sensitive to this issue because about 20 years ago when flexo started to become very successful they missed the chance to deal with it and as a result flexo print is not recyclable which causes a degradation to the quality of the paper. They do care that this doesn't happen again to them and it makes sense if parties that are involved in the same value chain should be aware of problems that the others have."

Potential solutions

However, it is not necessarily the case that all water-based inks will definitely cause a problem with de-inking. Ingede has already said that print from HP's Inkjet Web Press can be de-inked according to its criteria, due to the bonding agent applied to the media immediately prior to jetting the ink. Miller explains: "On the Inkjet Web Press,

the things that we do to enhance printability are in fact the same things that enhance de-inkability. For flotation de-inking to be successful requires that the colourants be in a form that is hydrophobic, so chunks of wax, or things that don't dissolve in water, and they need to be in the size range that they are not too big or too small to be effectively removed by the bubbles in a flotation process. And the bonding agent that we add to our Inkjet Web Press, or the ColorLok additive in our ColorLok media, these additives are designed to help aggregate our pigments at the surface of the paper. This is because by aggregating them we are quickly converting them to a state that is hydrophobic so they are no longer water dissoluble at that point."

Clearly, given HP's approach with the Inkjet Web Press, it is possible to develop aqueous inks suitable for de-inking with the current flotation method. No one doubts that it is possible to come up with other solutions, but development is expensive, so who pays for it? Should it be companies such as HP or Océ, already investing a fair chunk of R&D on printheads and ink systems for these printers? Or should it be the recycling mills or paper companies who will ultimately sell the recycled paper? Or should we simply not worry about how grey the paper is and start bleaching it? These are questions to bear in mind at IPEX where the inkjet printer vendors will be extolling the environmental benefits of water-based inks.

– Nessan Cleary

X-word Puzzle

Number 19*
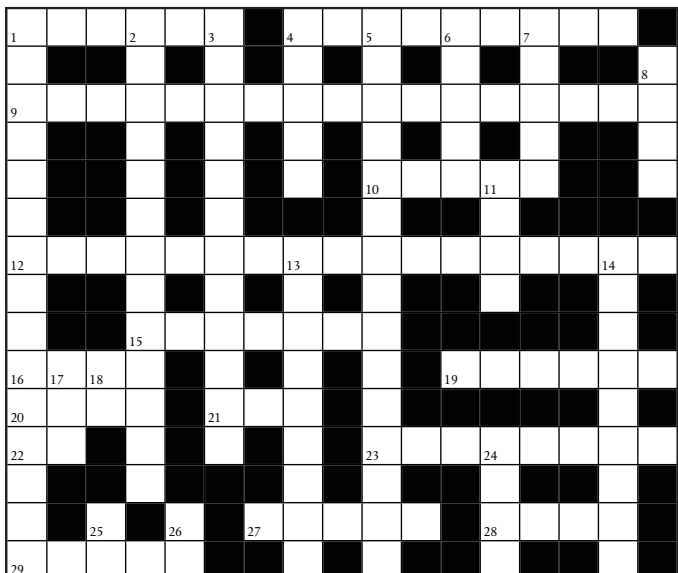
Across

1. It's a US thing: General Requirements and Applications for Commercial Offset Lithography

4. Going slowly, not rushed. (9)

9. A fast device, it is this for films or plates. (2, 4, 11)

10. The opposite of sooner. (5)

13. What's a printing technology that doesn't use piezo electricity? (1, 7, 3)

15. Takes up, believes without knowing. And so soon unless my eyes stop. (7)

16. Ended. (4)

19. The bit providing the link between a platesetter and the processor. (6)

20. What all of us lack and none of us can make. (4)

21. The unit of measure print jobs? Has something to do with speed? (3)

22. Intellectual property. (2)

23. Thermal and violet are examples of these. (8)

27. Mice, pointers, windows and what? (5)

28. What sheets should look like once make-ready is done. (4)

29. Another word for PMS colours. (5)

Down

1. This is the thing that every direct mail professional hates, yet very few marketers process them efficiently. (4, 4, 7)

2. The parts of the page a press needs to print consistently. (8,5)

3. Not all plate manufacturers are sure about this nomenclature. (3, 9)

4. Will we one day be able to do this to a printing press? (5)

5. 175 and 300 are examples of these. (4, 4, 7)

6. What used to be a reboot. (5)

7. In between. (5)

8. Not false. (4)

11. Not odd. (4)

13. Hue, saturation and something else represent points in an RGB model. (9)

14. Besides being patient what successful entrepreneurs have to learn to be. (3, 6)

17. Very important print? I might think so. (3)

18. Somewhat longer than an n-dash. (2)

24. They lead to riches and often to paper? (4)

25. The word no one wants to hear. (2)

26. After thought or PDL? (2)

* Answers at www.igaef.org

Number 18 – Answers

T	H	E	S	P	E	C	T	R	A	L	V	A	L	U	E	S
R		N		H		R			E		N		N			O
A	N	C	H	O	R		A		G		O		D			L
D		A		N		A	P	P	L	I	A	N	C	E		I
I	M	P	R	I	N	T				T			R			D
T		S		N			P	R	I	N	T	W	I	P	E	S
I	O	U		G	A	T	O	R		O		I		A		A
O		L		B			S				D		C	I		M
N	E	A	T	A	N	D	T	I	D	Y	D	E	S	K		P
A		T		C			S			I				P	L	
L	S	E		K	N	O	C	K	S		V	O	C			I
T		D				R				I			F			N
O	K		U	N	I	F	I	E	D		D	I	V	I	N	G
O		E				P		I		E			N			E
L	I	N	E	C	A	S	T	I	N	G	D	E	V	I	C	E