ISSUE 2
2011

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MESSAGE FROM BRYAN COLLINGS

It has not been a happy period as I write this. We have political turmoil in Arab regions with armed conflict and many people dying and terrible loss in Japan following the earthquake and resultant tsunami. Somehow it puts our commercial world into perspective. However, notwithstanding the world's disasters, I know that you will be pleased to see the results of FESPA's recent survey on page 6, indicating global printers are gearing up for a year of growth.

The positive mood was also very evident at FESPA's event in Florida, as well as during ESMA's successful Advanced Functional Printing / Membrane Switch Symposium conference in Düsseldorf which drew considerable praise from those attending.

We now await the new innovation that will be on show at FESPA Digital and our team would be delighted to meet with you in Hamburg. We're also seeing an excellent response already for GlassPrint 2011 to be held in Düsseldorf in November and have an exciting speaker programme with something for everyone involved in glass decoration. For a limited time you can take advantage of the 'early bird' registration fee at www.glassprint.org

Coupled with the technical know-how available at these industry events, you can make sure that you are completely up-to-date with the latest information on techniques and products by subscribing to Specialist Printing Worldwide for a total of only €55 / $80 / £45 per annum (see inside back cover). Elsewhere, our first ever Chinese language edition has been widely distributed to our Chinese readers and at the China Screen Print Expo in Guangdong, and more and more global readers are visiting our Process Information Centre at www.specialistprintinting.com

Bryan Collings, Publishing Director, *Specialist Printing Worldwide*

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MACtac has everything covered

The latest products from MACtac include interior and architectural materials, shop window films, products for car personalisation, plus a range of eco-friendly and anti-graffiti films, and specialist media for street graphics. MACtac Deco-texture simulates wallpaper with a crisp white textured surface, whilst MACtac WW300 is the latest in a range of films designed for wall graphics. A non-reflective matt finishes offers an anti-glare surface well suited to interior environments. These are complemented by a new range of MACtac PERMAfun laminates that offer a structured and textured finish within the film. These are designed to replicate various materials such as fine or coarse wood grain, leather, brushed metal and crystal.

Shop windows can benefit with the new MACtac Glassmovie Rear Projection Film which can be easily applied to any synthetic or natural glass.Teamed with a projector, Glassmovie creates an eye-catching animated display.

For car personalisation, MACtac films allow vehicle owners to customise their vehicles in a quick and cost effective way. The company's MACtac Tuning films offer a range of matt and carbon fibre finishes to enhance car interiors and exteriors.

MACtac continues to apply eco-friendly initiatives to its manufacturing processes. As part of this commitment, the company has launched a range of complementary laminates and a chlorine and phthalate free, white gloss, print film.

For floor graphics on streets, recent introductions are MACtac STREETrap and STREETrap Protect. The company says that these products will conform perfectly into any textured pavement surface creating an impressive effect.

The latest anti-graffiti development from MACtac is LAG 100, a new conformable laminate. Teamed with WW100 print film for exterior textured and brick surfaces, customers who find their buildings and walls regular targets of graffiti can now improve the appearance of their premises and make the site easier to clean. To complement this range of films, MACtac has also developed TAGaway as a less harmful, biodegradable, cleaning solution with a fast clean up-time. ■

New Aslan film offers very high adhesion

Aslan has launched a new digital printing film for special applications. Designated Aslan DFP 07 is a white glossy film which is suitable for printing digitally with all major solvent, eco solvent, latex and UV-curable inks. The material has high quality double-sided release liner which offers a very good flatness in the printer, moisture stability and ensures a constant and reliable printing process. The film is also suited for computerised cutting of logos and lettering.

Aslan states that the element making this product special is the adhesive. It is very strong and developed specifically for application to difficult rough and structured surfaces. The vinyl provides a high adhesion safety and is reliable for permanent applications such as glass, lacquer and aluminium bond. Due to the features of its adhesive the film is also suitable for the increasingly popular doming applications. ■

Visitors to Agfa learn about the Dotrix's packaging potential

More than 40 executives that joined the Packaging and Converting Executives Forum (PACE) during February visited the Agfa Graphics Digital Packaging and POP Innovation Centre in Belgium. Here they were able to learn the benefits of digital printing and the various high-quality packaging applications of the company's Dotrix industrial UV-curable ink-jet digital machine.

Agfa says that print specifiers have been looking to the Dotrix to provide cost-effective and eye-catching packaging for their products. PACE (www.paceforum.com) brings together the executives that shape the future of the packaging industry.

The Dotrix Modular gives brand owners a way to produce high quality printed packaging materials and it offers greater ROI than conventional printing methods for short and medium run lengths. Neil Falconer, Print Strategy Consultant with Pira, told the brand managers who attended the event at Agfa Graphics, that digital packaging is growing at an annual rate of 18 to 27% across various industry segments, including cosmetics, pharmaceuticals and food and beverage.

The Dotrix Modular from Agfa Graphics

Among the different packaging media, including corrugated, flexo and folding cartons, Falconer claims there is expected to be double-digit growth in the next five years. ■

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The Virtu RR50 from Polytype has won a second award

International committee chooses Virtu RR50 for design award

The 5m Virtu RR50 roll-to-roll printer from Swiss wide-format digital ink-jet manufacturer Polytype has been selected by the International Forum's (iF) Product Design Awards 2011 as a winner in the Industry and Skilled Trades category.

The Polytype machine receives the iF Seal of Design Excellence, which is valid for its entire product life cycle, and is included in the iF's Product Design Award Yearbook. The jury comprised 25 experts from various technology disciplines, led by Fritz Frenkler, professor of industrial design at the Technical University of Munich.

The award adds to the accolades already granted to the Virtu RR50, which last year won the European Digital Press Association (EDP) Award as the best superwide-format printer larger than three metres. The UV-curable engine outputs at an addressable resolution of 1,200 dpi across a spectrum of flexible materials, including textiles, and is available in four- or six-colour configurations plus white for over- and under-printing. Innovations proprietary to the Virtu range comprise its linear drive motor, which improves stability and image quality, and operational considerations such as assisted loading and its compact, robust architecture.

Capable of achieving speeds up to 320sq m/hour, the Polytype Virtu RR50 has the ability to print three 1.2m rolls simultaneously, heavy-weight reel handling and longitudinal and cross-cutting facilities. Its Virtu Flexo ink set produces no volatile organic compounds (VOCs) during the printing process, ensuring a high level of ecological responsibility, and can combine with a bulk ink system, making it suitable for busy production environments. ■

FESPA survey shows printers gearing up for year of growth

According to FESPA latest economy survey, 86% of respondents expect their businesses to grow in 2011, with more than half of those surveyed forecasting growth to exceed 10%. More than 17% anticipate growth above 25%. Half of all respondents believe the wide format market has recovered from the economic downturn. Reflecting on sales in the fourth quarter of 2010, 25% reported them better than 2009, 19% said they were better than expected, and 39% thought they were as expected.

The Economy Survey 4, conducted on behalf of FESPA by its research partner InfoTrends, is the fourth of its kind to be undertaken by FESPA on behalf of its global wide-format community. 432 respondents worldwide completed the electronic survey at the end of 2010, almost half representing the service provider community, with the remainder comprising manufacturers (22%), and resellers (18%). Three-quarters of respondents were evenly split between North America and Europe, with the remainder coming from the developing Asian, Middle Eastern, African and South American markets.

According to the Economy Survey 4, growth in demand among clients for environmentally sustainable print services is increasing as economic concerns abate, with 45% reporting a spike in interest for green printing. Nearly half of printers responding to the Economy Survey have already re-engineered their wide-format production practices to become more environmentally-friendly.

FESPA Sales and Marketing Director Marcus Timson comments: this fourth FESPA Economy Survey makes invigorating reading for our community. It shows an industry emerging with determination from the downturn, planning for growth, and anticipating and addressing shifts in customer demand." ■

QuickPrint SW's Danny Frayne (centre), and son, Richard (right), with Duncan Macdonald of Avon Graphic Technologies and the newly installed Roland VersaCAMM VS-640

Roland's VersaCAMM VS-640 is the instant choice for QuickPrint SW

Following a visit to an open day at Roland DG UK's new Creative Centre, Danny and Richard Frayne of Exeter-based QuickPrint SW made the instant decision to invest in a new wide-format printer. Following a comprehensive demonstration of the VersaCAMM VS-640 print-and-cut solution with metallic and white inks, they placed an order on the spot for this machine.

A long established print company, QuickPrint SW has nearly reached its half century, having been founded back in 1961 and remaining a family business since it started. Originally concentrating on offset litho production, as trends and technologies changed so the company has extended its services, broadening its portfolio of capabilities with continual, shrewd investment into the latest equipment.

"The moment we saw the Roland VersaCAMM VS-640 put through its paces, we knew this was the machine we needed to move QuickPrint SW forward in the market-place," states Danny Frayne. "We put our order in with Duncan Macdonald of Avon Graphics on the spot — and, since the delivery of the system, we haven't looked back."

QuickPrint SW's increasing demand from its growing customer base for wide-format production necessitated more durable output for greater diversity of end applications. Additionally, the exacting tolerances of the integrated cutting system in the VS-640 means that the company can now produce labels, stickers and decals. Using the variable data element in Roland VersaWorks production software, which is included with all its printers, jobs can even contain customised text and graphics as part of a production run. ■

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Sustainability report issued by Sun Chemical

Sun Chemical has released its 2010 sustainability report which shows data collected since 2005 from approximately 170 Sun Chemical sites in more than 25 countries. The seven key sustainability metrics measured in the data include energy consumption/conservation at production and non-production sites, the energy carbon footprint at the production sites, process waste reduction, water consumption, materials safety, and employee safety.

Providing a report that shows the ongoing management and monitoring of key sustainability metrics is an important part of Sun Chemical's sustainability policy.

Gary Andrzejewski, Sun Chemical's Corporate Vice President of Environmental Affairs, comments: "We have received favourable feedback from our customers when we issued our first sustainability report in 2009. They appreciate that Sun Chemical proactively provides them with meaningful data that they can use to understand our sustainability performance."

Michel Vanhems, Sustainability Leader, Sun Chemical, adds: "Through a defined road map, our sustainability policy pushes us as a company, to improve the eco-efficiency of our processes and products. This sustainability report not only provides our key sustainability metrics for 2010, it also gives numerous examples of Sun Chemical sites across the globe that reduced their environmental footprint or improved employee safety."

Both the 2009 and 2010 sustainability reports, along with the Carbon Footprint Report 2010 which outlines the results from nine independent environmental analyses focused on quantifying the carbon footprint of its product lines, are available to customers and can be requested online. ■

New moves for Drytac

Drytac Corporation has moved into bigger premises, with its new headquarters providing a larger warehouse, customer service and training facility in Richmond, Virginia. The extended product stocking capabilities will expedite the company's commitment to greater inventory levels and faster shipping turn-round for the east coast region.

The new headquarters also includes a large showroom for Drytac's extensive line of liquid coating equipment, including the VersaCoater XL60 wide-format UV liquid coater, edge finishing machines and portable displays. Drytac has long been noted for its on-going commitment to customer training and technical support for more than 35 years. The new facility will provide easier access to hands-on technical resources for customers seeking practical instruction in mounting and finishing skills. ■

TexaJet DX-SHE hybrid ink for polyester-based materials

More ink advances from Marabu

Marabu is expanding its digital printing portfolio to include water-based ink-jet inks for dye-sublimation printing.

The first product is TexaJet DX-SHE, a hybrid ink for both conventional transfer and digital textile printing on pre-treated polyester, designed for use with all equipment that incorporates Epson DX4 or DX5 print-heads. This is a high-density black ink coupled with intensive colours, suitable for all textiles with a minimum polyester content of 60%, and for rigid materials coated with polyester varnish.

A new premier solution for Mimaki JV33 printers is designated MaraJet DI-MS and is a mild solvent-based ink for wide-format printing. There is no need to change printer settings or ICC profiles and drying settings can stay the same. This ink comes in two sizes of a 440ml cartridge or a one litre bulk system.

MaraJet DI-LS is a mild solvent-based ink suitable for all wide-format equipment with Epson DX4/DX5 print-heads. Initially inspired by a supply bottleneck, Marabu has enhanced its formula, improving long-term stability and ensuring superior print results for a more even and glossy colour finish.

The new UV-curable UltraJet DUV-H ink is suitable for flat-bed and roll-fed applications, with good adhesion on rigid substrates as well as flexibility on non-rigid media, for example self-adhesive vinyl and banners. This ink can be used with a variety of industrial print-heads, comprising CMYKLcLm and a pure white with consistent sedimentation stability.

Also available are UV liquid coatings for flexible media following Marabu's development partnership between Welte GmbH (Freiburg), Robert Buerkle GmbH (Freudenstadt) and Marabu. Used in conjunction with the Buerkle LFC coater, Marabu's Marashield primers and coatings meet the high demands of industrial applications. ■

Saroj Chayavivatkul, President of TBC, with the XPose! 2FLEX

Lüscher's CtP solution boosts productivity at TBC

With continued customer demand for higher quality printing, in 2010 Thai Beverage Can (TBC) decided to digitise its plate-making process. Following extensive research, the management decided to install an XPose! 2FLEX from Swiss manufacturer Lüscher AG.

As well as offering outstanding imaging quality, the flexibility of the XPose! 2FLEX allows boosted productivity and ease-of-use by exposing four letterpress plates simultaneously. The machine was also specified with registration pins that matched the printing units and, as a consequence, the set-up times on the production lines and waste have both been reduced dramatically.

Thai Beverage Can was founded in 1996 and is a co-venture between the Thai companies Berli Jucker Public Limited and Standard Can Co and the American Ball Corporation. As a leading manufacturer of two-piece aluminium cans and ends for beverages and beer, TBC has the latest manufacturing equipment from Ball Corporation and has installed two of the latest production lines and end lines within a state-of-the-art facility. Each of the lines has a capacity of 1,650 cans/minute and produces up to 1.2 billion units per year for Thailand and further markets in Indochina.

Jongkol Kungvansith, Senior Vice President of Production, is extremely satisfied with TBC's investment in digital plate making using the XPose! 2FLEX. He says his high expectations for cost-efficiency and quality improvement have been entirely fulfilled by Lüscher. ■

FineEye Color fine-tunes colour optimisation with launch of ICEserver 3.0

The next generation in its colour-optimising software technology is now available from FineEye Color Solutions. With the addition of ICC colour management and tone correction features, ICEserver 3.0 delivers the same quality enhancement and ink savings to owners of digital devices which are enjoyed by offset litho users. This latest version of ICEserver is a client/server system, with a browser-based user interface, which simplifies implementation and deployment.

ICEserver 3.0 is a colour separation technology that increases the visual appeal of print, adheres to standards and reduces manufacturing costs. A hot folder enabled Windows Server application. It processes press-ready CMYK, RGB and greyscale PDF files prior to output on virtually any process colour imaging system, including offset and digital presses, inkjet and toner devices.

"ICE stands for the Intelligent Color Engine, the core technology of ICEserver. Our ICE technology was developed to optimise colour output by addressing the deficiencies in today's colour separation technology," says John Sweeney, FineEye Vice President Marketing and Industry Relations. "The substantial ink and colorant savings ICEserver delivers is a by-product of an optimised colour separation. With the new ICC and tone correction, ICEserver is now process agnostic. Given the cost of ink-jet ink and toner, as well as increasing cost of offset ink, the savings opportunity is substantial, and quality is maintained or improved." ■

ICEserver 3.0 colour separation technology increases the visual appeal of print

API Foils launches holographic print solution

With 'on-shelf stand out' continuing to be crucial for companies in a range of sectors in order for products to catch the eye of consumers and sell off the shelf, API Foils and Holographics – one of the largest and most innovative foil and holographic manufacturers has launched a new, high impact but cost-effective bespoke holographic design solution called Holonique.

Holonique is being positioned to fill the gap in the holographic market between the two distinct categories. Off the shelf holographics provide eye-catching 3D effects, are easy and cost-effective to implement but are limited when it comes to customisation. Bespoke origination holographics allow this customisation but, due to the technical nature of the production process and the time it takes to produce mock ups, the design process can be expensive. Furthermore, it is often difficult for brands to visualize the end product often resulting in further costs and delays if designs are rejected.

Holonique is offering companies the best of both holographic worlds. Not only can it combine numerous holographic patterns, images and logos with an almost unlimited number of styles, effects and colours to provide customized, 3D product enhancement but new designs and mock-ups can be created in a matter of days at hugely reduced costs. Holonique also offers companies control over the whole holographic design process.

As criminal organisations continue to use all of their ingenuity to copy and counterfeit packaging, Holonique can also provide a first level of counterfeiting security. When used with API's other security solutions it can be used to help all sections of the supply chain clearly differentiate between fakes and the real thing. ■

Peter Williams of Digitl Ink

ITL evolves into new era as Digitl Ink

Ink Technologies (UK) Ltd (ITL), British manufacturer of after-market ink-jet inks, has overhauled its brand and management team. The company name is now Digitl Ink Ltd, with former Sales and Marketing Director Peter Williams moving into the role of managing director.

"Digitl Ink was already the mainstay of our brand identity, so it was a logical transition to make it our name when we decided to reinitiate the company," explains Williams. "We remain committed to providing consistent, high-quality alternative inks for all leading printer brands, to continuing production in Great Britain, and to offering the best customer service available in this sector."

All staff have kept their roles since the changeover to the new name, and Digitl Ink will continue to operate from the same premises in Cheadle Hulme, Manchester, UK. Robin Titterington, formerly managing director of ITL, has left the company to pursue other ventures.

This year will also see Digitl Ink renovate its presence online, including an expansion into social media for both support and sales purposes. All manufacturing and product development takes place in the UK only. Its products span a multitude of applications, including eco- and full-solvent, water-based, UV-curable and coding inks. ■

Zünd's new board handling system

Increased automation added to Zünd digital cutters

With the emphasis on short runs and just-in-time production, Zünd has introduced a new board handling system which it says offers greater efficiency and fully automated digital cutting.

This new option, designed for the fully automated production of signs, displays and packaging, is designed to be modular and can be implemented gradually. With full automation of both the loading and unloading processes, virtually no set-up or operator intervention is required. Zünd's Cut Center software ensures user-friendly system operation and this combines to enhance productivity when loading and unloading pallets of stacked boards and finished products.

In developing this automated material-handling system, care was taken not to lose sight of the need for processing single boards. The accessibility and easy set-up of the system allows one-offs and samples to be produced as efficiently as short and medium runs. ■

Heidelberg USA takes on VUTEk printers

A new agreement has been formed where Heidelberg USA will distribute the VUTEk GS series of wide- and superwide-format digital printers to the commercial market across America.

Under the agreement, Heidelberg USA will distribute EFI's VUTEk GS2000, GS3200, and GS5000r as well as the inks, parts, consumables, accessories and upgrades related to these printers. The company will also provide customer and technical support for the VUTEk GS series of printers including installation and training.

"We're excited to enter into this distribution agreement with Heidelberg USA. It allows us to bring Heidelberg customers our award-winning digital printers," says Frank Mallozzi, Senior Vice President of Worldwide Sales and Marketing at EFI. "Commercial printers are looking for ways to distinguish themselves and offer their clients more diversified products and services. Now we can reach those companies through a broader network."

Heidelberg USA will have a GS3200 in its North American Print & Packaging Technology Center (NAPPTC) for demonstrations. The machine will be integrated into a complete Prinect workflow and will be colour managed by Heidelberg's Prinect Color Toolbox which has recently been awarded the IDEAlliance G7 System Certification. Customers will benefit from a single workflow that drives a digital device and an offset press with the result being a colour matched output from both.

"Wide- and superwide-format printing are high-growth opportunities and Heidelberg has the right work-flow, colour management, service and Saphira consumables expertise needed to integrate these technologies into a print production environment," states James Martin, Senior Vice President, Marketing of Heidelberg USA. ■

New trio of films from Poli-Tape

Poli-Tape Group has introduced a new range of products including flock, printable and hot melt films. The company's Poli-Flock Prime is a high quality heat transfer rayon flock which has a velvety feel and brilliance, yet is based on ecologically harmless raw materials and is free from PVC and plasticiser, in accordance with Oeko-Tex Standard 100. It has a high was resistance of 90ºC and can also be dry-cleaned. It is available in 14 standard and four neon colours.

Poli-Flex Printable 4015, 4016, 4665 and Ultimate Print Matt 4025 are suitable for the production of heat transfer doming-applications. The hot melt coated transfer films serve as carrier material for dome casting; in combination with digital printable flex and 3D doming applications, users can create a range of attractive designs.

The third new product is the Poli-Melt range of hot melt films which are covered by a siliconised liner. The range comprises of Poli-Melt 700 (co-polyester), Poli-Melt Nylon 701 (polyamide) and Poli-Melt PU 702 (polyurethane). All products have a thickness of 50 micron and will be available in standard dimensions of 500mm x 25m. ■

Poli-Melt is a new range of hot melt films covered by a siliconised liner

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WORKING TOGETHER IN A LIVE ENVIRONMENT

Sophie Matthews-Paul

When I was asked originally to help put together and moderate a real-time print shop as part of FESPA Americas, I greeted the invitation as a challenge. Many people said it couldn't be done, but the doubters were proved wrong as we successfully integrated several different manufacturers, their workflow and their printers, into a feature called Wide Format Print Shop Live.

Not surprisingly, it took several months of communication and discussing with the manufacturers agreeing to take part. But we were extremely fortunate to be supported by EFI, HP, Roland, Caldera and EskoArtwork and the result was a complete start-to-finish work-flow which featured everything likely to be encountered in an everyday production environment.

The print shop was laid out to start out with EFI whose Digital Store Front had been configured as an upload option for tour visitors wanting to submit artwork. This is a web-based dual-purpose platform which can be customised for companies who want to offer an easy-to-use front-end solution for uploading jobs.

Next from EFI was a quick run-through of its Pace product, a complete management information system, again browser based. From here we moved onto the latest version of EFI's Fiery XF RIP which was used to drive a VUTEk GS2000 on the stand.

EskoArtwork's i-cut suite was demonstrated next. The company's i-cut Preflight module checked incoming PDF data, before jobs were passed to i-cut Layout for interactive nesting and step-and-repeat so that users get maximum coverage out of their materials.

Caldera showed the Macintosh version of its production software preparing jobs for the HP Designjet L25500. The company also demonstrated TotalColor which utilises the Barbieri Spectro LFP, used to measure colour to create ICC profiles, linearise output devices and other related functions.

The final software on the tour was Roland's VersaWorks and tour participants learned how integrate metallics, white ink and cutting paths into their jobs. This software is included with every Roland printer and includes a host of advanced options, including variable data printing and versioning, plus support for precision contour and perf cutting.

The tour then moved onto the first of the print devices. Driven by the Caldera RIP, we started with the HP Designjet L25500, one of the company's family of machines which incorporates latex printing technology. Like its larger counterparts, the HP Scitex LX600 and LX800, this system prints direct to a variety of roll-fed materials with the ability for output to be laminated immediately after printing without outgassing.

The next demonstration was on the print-and-cut Roland VersaCAMM VS-540 running eco-solvent metallic and white inks as well as the standard colour set. This version the VS machine family was shown outputting to a variety of media and different applications. We used this machine primarily to print our intriguing giveaways.

The final printer on the tour was the EFI VUTEk GS2000, a 2m hybrid UV-curable unit for printing direct to rigid and flexible materials.

Arzen Tornyai's mementoes bring printed on the Roland VersaCAMM VS-540

Many of the images generated on this unit during the tours were subsequently contour cut so that visitors had manageable sized samples to carry away with them.

Last but not least on the visitor tours was EskoArtwork's Kongsberg i-XP cutting table which generated a huge amount of interest. Jobs which had been prepared earlier were being contour cut, and the machine was put through its paces on rigid materials as well as roll-fed media.

For a typical print-to-cut workflow job, we'd also enlisted the services of a very talented Hungarian designer, Arzen Tornyai. Two years ago I went to visit him in Budapest where I discovered his incredible skills in dreaming up three-dimensional ideas in his head, transcribing them to a computer and cutting them out on his EskoArtwork Kongsberg table.

When we wanted a giveaway we could produce in real-time for Wide Format Print Shop Live I contacted Tornyai and asked if he could help, and the result was a folded bird which visitors could watch being generated and nested on EskoArtwork's i-cut suite. From here it passed down the line to the Roland VersaCAMM VS-540 where we used its print option to produce multiple images, before it was cut on a Kongsberg table.

After three days of tours, Wide Format Print Shop Live had proved to be the success we'd all hoped for. And we couldn't have achieved that without the backing of the capabilities of the participating companies. In terms of visitors, there was an interesting mix. We had businesses already involved in digital print, offset companies and screen-printers and, boding well for the future, there was a representative percentage of students. Some of these attendees even admitted that, having seen live workflow in action, they were tempted to move into the wide-format print.

The plan now is take Wide Format Print Shop Live to other events, and we're already looking at FESPA Americas in Miami 2012. It's characteristic of FESPA's innovative approach to events that they were the first to present such a useful and visitor orientated feature.

Sophie Matthews-Paul

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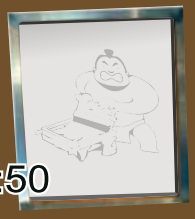

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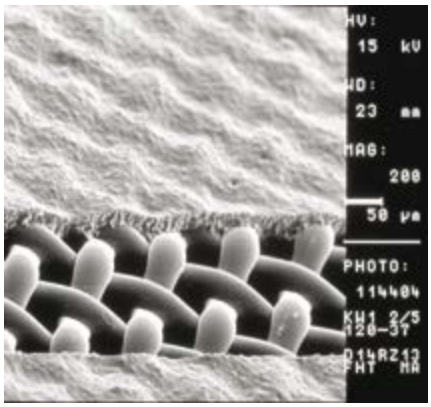
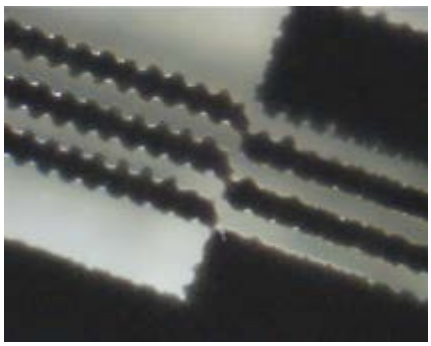
SCREEN-PRINTING STENCIL PRODUCTION FOR GLASS PRINTING

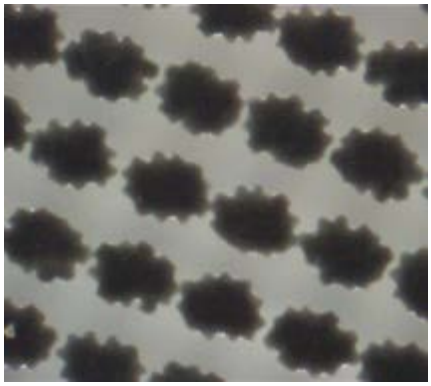
Michael Gross presents methods for eliminating problems inherent in this process

An important key to the successful printing of glass material is the preparation of a proper screen-printing stencil. Unfortunately, the stencil production in many companies is only regarded as a means to an end and, therefore, increasingly is often neglected. Customer complaints about poor print quality or different print results with repeat orders are often the result of inadequate stencil production. But smaller problems within the print run, such as frequent cleaning due to smeared print patterns, or screen replacement due to inadequate stencil life, often have their origin in the production of the stencil. Mostly the causes of errors can be fixed without any or very little cost either financially or time wise. This article describes common error sources with solutions.



Macro shot: Low emulsion build-up with high Rz value


[Print result with EOM too low and Rz value too high. Seen at 140 times magnification]

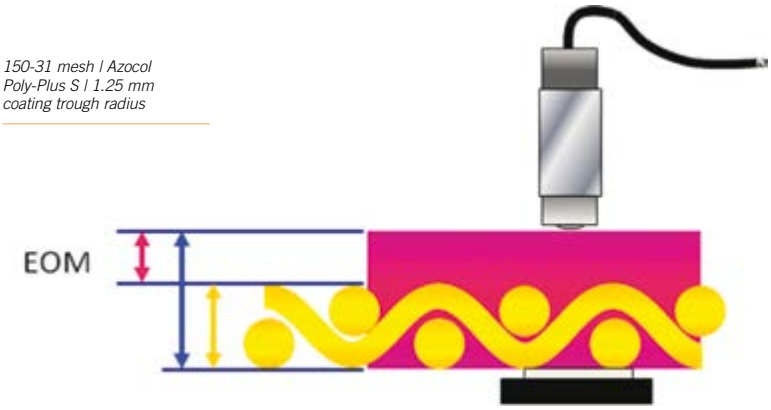

[Print result with EOM too low and Rz value too high. Seen at 140 times magnification]

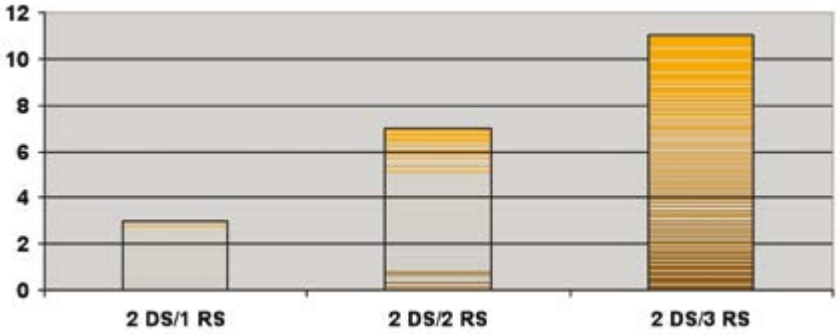
COATING TECHNIQUES

If the stencil is coated in-house, a liquid emulsion is usually used, which is applied by hand or machine with a coating trough. Often the fault lies in the wrong coating technique being employed or the coating trough selected being unsuitable for the coating method. A common result is an emulsion build-up on the printing side (EOM = emulsion over mesh), which is too low, and a subsequent high surface roughness (Rz) value.

Due to the low EOM, the screen fabric at the motif edge is in contact with the material to be printed and prevents clean ink release in these areas. The high Rz value does not close cleanly onto the printing edge with the material to be printed, and the ink or printing paste runs under the print edge. In both cases the result is a so-called saw-tooth effect at the motif edges. When screen-printing half-tones, stars are printed instead of defined dots. This leads to strong tonal value changes,

150-31 mesh / Azocol Poly-Plus S / 1.25 mm coating trough radius





uncontrolled tonal value jumps and dot smearing in the deep tonal ranges.

Measuring the stencil build-up thickness (EOM) with a magnetic inductive measuring system:

The formula for calculating the EOM is as follows:
(mesh + emulsion) – mesh = screen build-up thickness (EOM) in µm (micrometre)

Measuring the surface roughness:

The diamond stylus of the Rz-value measuring unit feels the surface of the printing side of a coated and exposed stencil at an angle of 22.5 degrees to the mesh. The value measured is given in µm (micrometre).

PREVENTATIVE MEASURES TO AVOID PROBLEMS

The problems mentioned can be solved by taking the following measures in the production of stencils:

1. Customising the EOM to the fineness of the screen mesh

The emulsion build-up over the mesh should equate to 20% of the stretched fabric thickness for printing line work and coarse half-tones and when print media are used with solids content below 50%.

To print fine half-tones, and when print media with solids content below 50% are used, an emulsion build-up of about 5 to 10% of fabric thickness is recommended.

If print media with a higher solid content (such as UV-curable inks) are used, the emulsion build-up over the mesh should be 5 to 10%.

For special applications, for instance when printing heating elements with silver conductive paste, additional parameters should be taken into account with regard to the stencil build-up.

- Where printing pastes with above average sized large pigments are used, the ratio between EOM and pigment size should be approximately 2:1, in order to have even paste deposition right up to the print edges.
- When finer motifs are printed, the actual size of the motif also has an important role to play in the choice of EOM. In order to obtain a thorough printing paste deposition, the EOM should be no more than half the size of the print motif. If this ratio is exceeded, there is a danger that adhesion forces in the printing channel will prevent thorough deposition of the printing paste.

The EOM can, for example, be influenced by changing the following parameters:

- Change the number of coating passes

The higher the number of coating passes from the squeegee side, the higher the EOM on the print side.

Graph of the change of EOM with increasing coating passes on the squeegee side:

- Changing the radius of the coating trough

The larger the trough radius of the coating edge, the higher the EOM on the printing side.

Diagram of changes in EOM when using different trough radii:

- Changing the solid content of the emulsion

The higher the solids content of the emulsion, the higher the EOM on the printing side.

Graph of the change of EOM with the use of emulsions with different solids content:

2. Reducing the Rz value

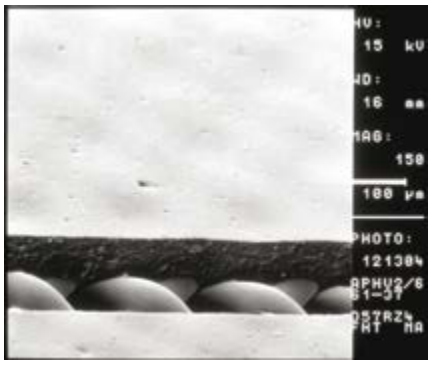
A low Rz value on the printing side is essential for clean print results. To avoid saw-tooth during printing, which is caused by the surface roughness on the printing side, the Rz value should in principle be less than 10 microns. Rz-values less than about 4 microns are not recommended when printing on glass.

A very smooth surface with an equally smooth stencil underside can form a vacuum between the substrate and the stencil. The substrate is then difficult to separate from the stencil. Another problem is the generation of static electricity during printing. When the stencil is separated from the substrate, an electrical discharge takes place; ink spidering on the printing edge is usually the result.

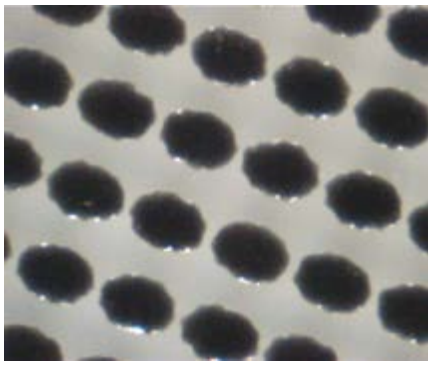
The Rz value can, for example, be influenced by changing the following parameters:

- Change of the emulsion build-up over the mesh

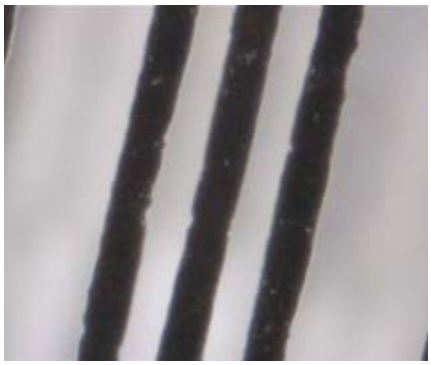
Continued over



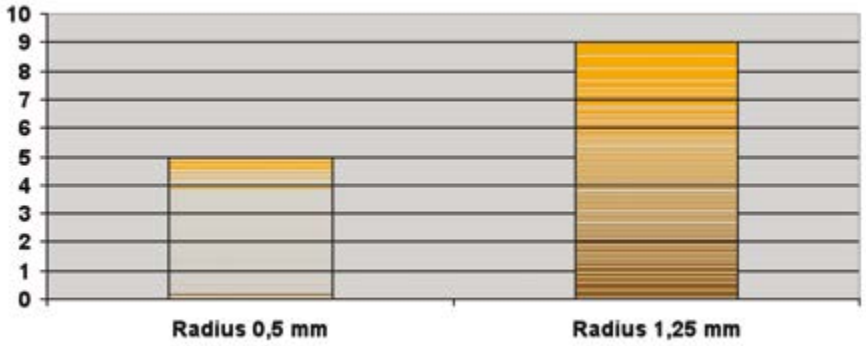
Macro shot of a screen-printing stencil with optimum EOM and Rz-value



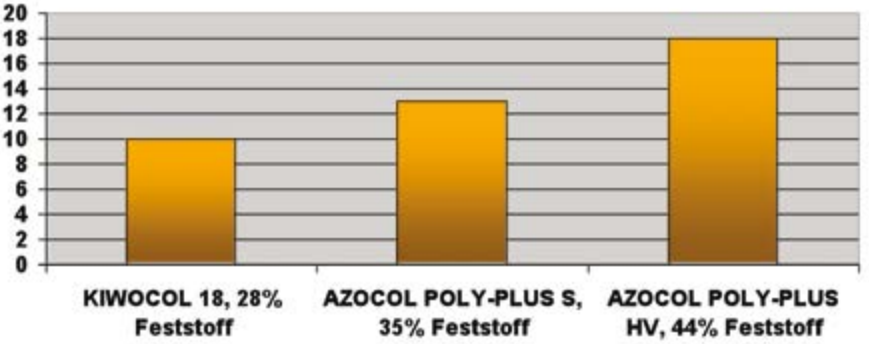
Print result with an EOM of 7 microns and an Rz value of 5 microns. Seen at 140 times magnification



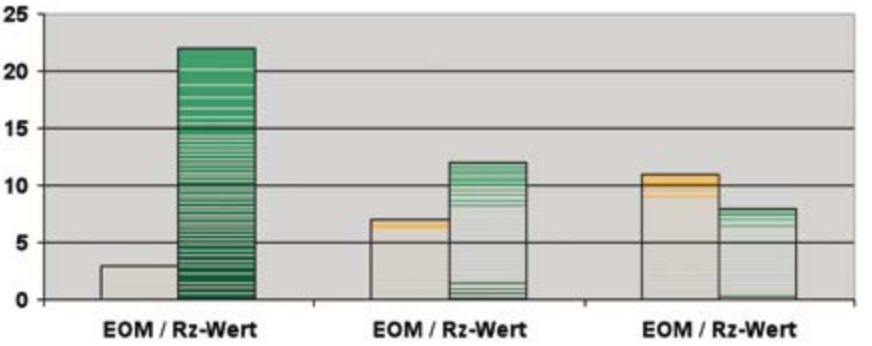
Print result with an EOM of 7 microns and an Rz value of 5 microns. Seen at 140 times magnification



120-34 Mesh I 2 x DS / 2 x RS I Azocol Poly-Plus S



120-34 mesh I 2 x DS / 3 x RS I 1.25 mm trough radius



120-34 mesh I Azocol Poly-Plus S

The higher the EOM with a wet-on-wet emulsion coating, the lower the Rz value.

Diagram of changes in Rz-value with increasing EOM:

- Additional coating with intermediate drying

Another possibility for reducing the Rz value is to coat the previously coated fabric on the printing side after intermediate drying. By pre-coating using 'wet on wet coating technology', the desired EOM within 2 to 3 microns can be achieved. After drying, usually 2 to 3 additional coats with intermediate drying are applied to the printing side. Thus, through gradual drying, the fabric structure is equalised and the Rz-value is decreased.

The larger the number of additional coating passes on the printing side, the lower the Rz value.

This technique is particularly suitable for printing with UV-curable printing media and printing of fine line designs, as even with a low EOM, low Rz values can be achieved.

3. Stencil production with capillary film

A capillary film consists of a light-sensitive emulsion, which is coated with a defined thickness on a thin plastic film and then dried. The dry film is then rolled out in the standard application method with the emulsion side on the previously wetted fabric .

The film, which is still water-soluble, swells and through the capillary action of the mesh it sinks into the open areas of the mesh. The coated stencil is dried with the printing side up. The main advantage of capillary film is that the surface roughness is defined by the plastic film. A stencil with optimum Rz value is therefore obtained without much effort. This lies in the region of 3 to 6 microns, depending on the type of film and the surface properties of the carrier material.

4. Stencil production with Sefar PCF-mesh

The PCF Sefar mesh is a fabric, which is partially or completely coated with a photosensitive emulsion. The pre-coated fabric is stretched and bonded to the screen frame in-house or by a service house. The print side is covered with a plastic film like a capillary film. Similar to the capillary film, the surface roughness is defined by the plastic carrier film and has an optimum Rz value for printing.

If stencils are made with these coating techniques, a significant increase in print quality can be achieved. ■

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BRIDGING THE GAP

Syd Northup discusses optimised ink-jet proofing for sublimation offset printing production

The ability to create digital proofs that depict and match the customer's desired image, and then reproduce those images in a production atmosphere, has been an issue for the greater printing industries for as long as there have been proofing devices. Add to that the dye sublimation process and the chance for an accurate, cost-efficient and optical match from digital to offset drops considerably. However, there is now a proven solution to the age-old problem of matching digital proofs to offset production.

The typical work flow for sublimation offset production starts with the graphic design file being sent to the offset printer, where it goes through pre-flight and is checked and amended for colour hue and optical density. The design is then output by a sublimation ink-jet printer and transferred onto the customer's final substrate. Minor changes are made to the art file and a suitable digital colour copy is created and approved by the customer.

The file is then sent to the plate department, where the computer-to-plate (CtP) software creates the first set of plates. These plates are hung on the press, production starts, standard densities are achieved and the first pulls are transferred onto the customer substrate. More often than not, the offset result does not look nearly as good as the ink-jet proof, as they might differ in overall colour accuracy or optical density.

At this point, the pressman begins to adjust ink density levels, starting and stopping the press each time to transfer a new press sheet at different ink densities. The offset press cannot match the approved ink-jet colour-copy and the job is kicked back to the pre-press department, which now tries to fix the image by manipulating the original file in the graphic software. This results in the burning of new plates, and the production cycle begins all over again. On critical jobs, it's not unheard of for this circle of corrective action to go on for hours, creating wasted time and expensive materials, and a loss of the customers' patience and confidence.

BRIDGING DIGITAL AND ANALOGUE TECHNOLOGIES

The solution to this costly problem begins with the ink manufacturer. Gans Ink and Supply Co has more than 35 years of experience in analogue sublimation ink manufacturing, and possesses the specific knowledge base to create the bridge between the digital (ink-jet) and analogue (offset) technologies. In late 2009, the company completed development of what it claims is a unique matching process which, when implemented creates a consistent, repeatable and incredibly accurate turn-key digital ink-jet sublimation matching system. Then, it created a proprietary method of successfully linking the output of the front end (digital) to the output of the back end (analogue) to create

Pyrojet sublimation inks proofing on an Epson Stylus Pro 9890 ink-jet printer

Gans sublimation offset inks on a Heidelberg offset press

perfect or nearly perfect matches consistently, with little or no adjustments required in either digital or offset. In most cases, the initial set of plates is the only one required and the first pulls match the ink-jet generated proof.

How is this solution achieved? The initial steps in setting up the process begin in the pre-press area. The ink-jet printer, with proprietary software installed, is linearised to the desired optical density and colour gamut and the process then moves to the press-room. The press is readied to print and the press-man is asked to run at prescribed achievable and realistic density levels the printing of the Gans Ink linearisation form. When those levels are reached, the printed sheets are then pulled for transfer and analysis.

After a series of densitometer readings and algorithmic calculations, it's time to go back to the CtP and re-linearise to the now-measured specifications of the offset output. At this point, the linking solution is complete, and a unique plate profile is locked in for that particular substrate. For each new substrate, this process would need to be duplicated to ensure a reproducible match between the proof and the finished product.

OVERALL BENEFITS

The benefits to this solution are many. There can be huge cost savings to the offset printer in the form of reduced plates, ink and paper usage, as well as press downtime and overtime wages. The investment to achieve these reductions can be recouped in a very short pay-back period. Another advantage is the enhanced colour gamut that can be achieved on the offset press. An ink-jet printer, by its nature, can produce a richer, more saturated product than an offset press; but once the linearisation is set with this process, whatever is achievable on the ink-jet printer can be reproduced on the offset press.

Yet another benefit relates to the graphic design aspect. Whether the design department is in-house at the offset printer or an outside independent, an ICC profile can be created that allows the designer to work within the identical colour space that is achievable both in the ink-jet printer and on the offset press. This allows the designer to produce realistic images and colour saturation levels that can be reproduced in the sublimation ink-jet and offset environments.

It is the belief of the author that no solution like the one described above is in existence today. The 'art' of offset sublimation printing can now be more scientifically approached to create consistent and reproducible results while minimising costs associated with the offset process. ■

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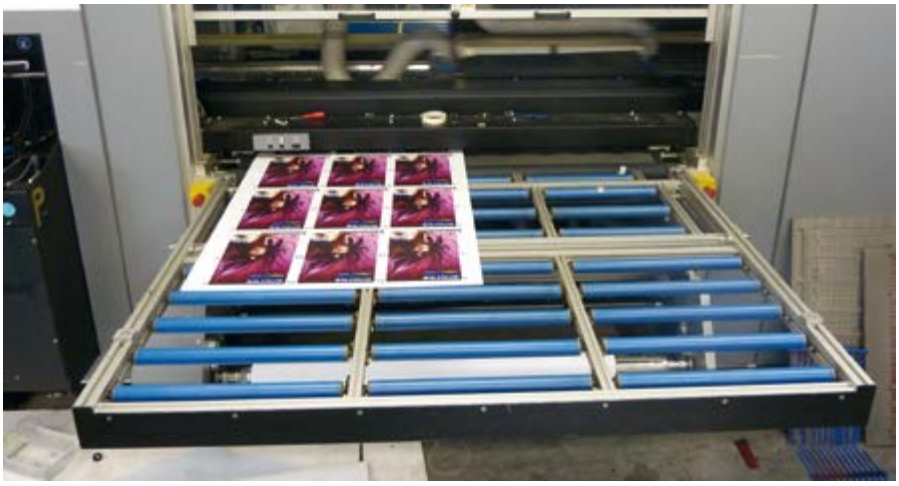
WHEN ALTERNATIVE DIGITAL INK MEETS WITH QUALITY NEEDS

Laurent Mesplomb looks at alternative ink options for today's UV-curable machines

For more than two decades, digital printer manufacturers improved the performance of UV-curable machines in the wide-format market by increasing the line speed, optimising the vacuum system, the power consumption, the print head performance, software and computer controlled system, and also by improving the ink quality. There are so many parameters that can make a good impression turn into a disaster that it could be useful to begin the job with an OEM UV-curable ink (just to learn and to fine-tune all the parameters of the application). For the majority of the time, printers are sold in a package with contract maintenance and ink.

After this contract has expired, it can be interesting for a customer to corroborate with an alternative ink supplier. Indeed, ink consumption is a critical factor as the price of UV-curable ink is comparatively higher than the price of solvent-based ink or even UV-curable products used in the screen-printing industry.

Contributing to this challenge, for many years Encres Dubuit has been developing UV-curable inks for the graphics market that could save time, money, and boost productivity for the customer. The Evojet series represents the fruit of this research in terms of thermal stability, particle size, adhesion, reactivity, intensity, odourless chrmistry and jet stability.



Evojet 1515 UV-curable ink in a Durst printer

Inks contain some type of colorant, typically a pigment or a dye (pigments are most often used due to their superior light fastness). The pigment must be ground to very small particle sizes to flow through the print-head nozzles. However, accumulation and flocculation, or clumping and massing, can occur more readily at these sizes, which can lead to sedimentation and instability. Also, the smaller particle sizes can have a detrimental effect on the weathering ability of the pigment as well as the colour gamut and opacity, both of which are influenced greatly by particle size. Proper dispersion techniques and additives can also help alleviate this to some degree.

Lengthy and important research has been made at Encres Dubuit by its research and development department to go into the heart of the problem of the adhesion and/or reactivity. As the viscosity needs to be around 11 centipoise (dynamic viscosity) at the print-head temperature, all the raw materials used in the Evojet series have been screened and analysed. Formulations of a digital ink forbid the use of oligomer and monomer with very high viscosity and with impurities. This the reason why the company's research and development department has carried out considerable trials for thermal stability (more than 80ºC for an eight-day period, and at minus 25ºC during the same period) and tested all the Evojet inks with Fujifilm Dimatix Spectra, Xaar, Konica, Ricoh, and Seiko heads.

Drop-on-demand devices, engaged in these print-heads, are at the heart of most modern ink-jet printers. The fluid dynamic process during drop ejection is complex, involving time-dependent fluid interface disruptions. Typically, a drop-on-demand device consists of a fluid chamber with an opening called a nozzle from where drops are to be generated under actuation. The basic function of actuation is to push a certain amount of the liquid out of the fluid chamber through the nozzle.

If the fluid pushed out of the nozzle gains enough forward momentum to overcome the surface tension restoring effect, a drop can be ejected. In the ideal drop ejection cycle, the

This ink is claimed to exhibit great flexibility and good adhesion on DiBond and other rigid substrates, and this also facilitates die-cutting

fluid in the chamber is initially at rest, only driven into motion to eject a drop in response to an electrical command, before returning to its original rest state after re-filling from the ink's reservoir and undergoing viscous damping. The basic mechanism of actuation is to convert the electrical signal (typically in the form of a pulse) into mechanical motions of fluid. After this short description of the drop-on-demand technology, it's easy to understand the difficulties faced by a manufacturer of ink when making a good digital fluid. With the experience of Encres Dubuit for the formulation of UV-curable ink and with the collaboration of Machines Dubuit to understand all the mechanical parameters, it was easier for the company's chemists to improve the quality of Evojet ink.

As Encres Dubuit is now well established in the basic UV-curable wide-format graphics market, with digital inks for NUR, Durst, VUTEk, Matan,Agfa's Anapurna and Jeti, amongst others, the company is thinking about the future. A growing number of choices for UV sources are available allowing OEMs greater flexibility in their machine design including the use of light emitting diodes (LED). This is the reason why Encres Dubuit has developed a new series called Evoled so that it can respond to this demand. Furthermore, more major advancements in the ink-jet printing process have been a direct result of advances in print-head technology. Recently, major print-head manufacturers have announced new breakthroughs in precision placements of droplets and grey-scale printing using variable drop sizes, thus continuing technology leadership in the UV-curable ink-jet delivery systems with machine manufacturers integrating the components. There are as many choices as there are applications and an example where the challenges were taken up when an ink was created especially for glass printing.

Another challenge is to adapt products for single-pass machines such as those for the label market. In this case the difficulty has been the speed of polymerisation and the dot placement to obtain a perfect image without loss of nozzles.

The industrial market is a new, exciting and continuously evolving arena that differs in many ways from the graphic arts market. The demands are different for each industrial application, so ink sets must be custom formulated for various substrates and end users. The substrates used in the industrial ink-jet market are many and varied, from metals and glass to formable plastics and beyond. These printed materials will be used for many applications other than signs and decoration, hence the need for robust ink sets.

Additionally, off-the-shelf printers that were designed to deposit one ink set onto flat stock generally do not work for industrial printing. Many of the objects printed for the industrial market are 3D, requiring sensors to guide the print-heads over the surface. The curing properties for a significant number of the inks developed for industrial applications are different than standard graphic arts inks, requiring UV bulbs with different spectral outputs, as well as thermal curing capabilities; for example an infra-red lamp could be used in-line to aid the curing process.

These equipment and ink requirements make it impossible to produce an industrial printer and ink set to fit every need. This impacts the market path, too, as speciality integrators must be enlisted to design the equipment on a per customer basis. In this market, alternative inks as Evojet from Encres dubuit are less of an option, due to the required customisation. ■

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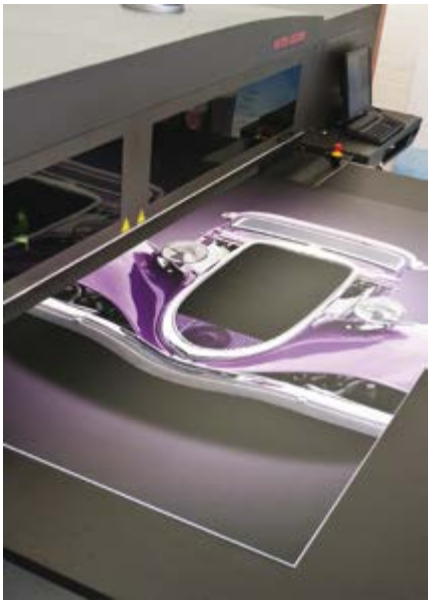
WHY IT MAKES SENSE TO MOVE TO UV-CURABLE INK CHEMISTRY

Sophie Matthews-Paul puts forward reasons for making the transition from other formulations

More print companies are now turning to UV-curable printers



Typical output onto a rigid material with UV-curable inks

Vibrant and durable colours can be produced using UV-curable inks

Worldwide, environmental issues are driving industries to look for greener methods to adopt within their production processes. Within the arena for wide-format digital print, this has been realised by a metamorphosis in ink technologies and a massive move by display producers to adopt the benefits of UV-curable formulations.

Where once the only route to durable output was via solvent-based formulations, today's UV-curable ink chemistries have proved themselves time and time again. Not only can they be used on rigid substrates, where before there was never an option for printing direct, but they are suitable for applications produced on roll-to-roll materials. These inks produce no VOCs (volatile organic compounds) and because they remain liquid until cured, printing machine maintenance is minimised as no clogging of print-heads and feed lines occurs.

With durability being an issue in the ink-jet production of displays, the originally perceived benefits gained from solvent-based products provided an answer to longer life-spans and vivid colours across a wide range of coated and uncoated materials. But the disadvantages from using this type of formulation were quick to manifest themselves in terms of hazardous chemicals and unpleasant odours. Thus, the industry and end-users alike welcomed the alternatives offered by UV-curable inks which are more pleasant to work with and also lift restrictions on the type and weight of the materials being printed.

As a result, the major transition in recent years to UV-curable ink has been two-fold. Firstly, solvent-based products cannot output satisfactorily onto rigid materials and, secondly, increasingly the use of hazardous chemicals in production and end-user environments has resulted in international demand for VOC free inks.

THE BEHAVIOUR OF CHEMISTRIES

The different chemistries and how they behave are not always appreciated by end users who are involved in the production of displays and other wide-format applications. Solvent-based inks are available in various strengths, with the mildest being called eco-, low or mild and the strongest designated hard, full, aggressive or harsh solvent. The milder the solvents' strength within the ink, the lower the durability quotient and the slower the drying time; the strength of the solvent lies in its capabilities as a carrier of the pigment. Eco- and mild solvent inks normally incorporate relatively slow drying carriers which necessitate more heat to dry the print, whilst higher levels of solvent content speeds up the drying process.

The way these two chemistries are formulated also demonstrates why moving across to UV-curable inks is becoming increasingly popular. A solvent is not an ink type as such but is a substance, in this case a liquid, that is used to dissolve another substance. The inclusion of solvents with coloured pigments gives them the purpose of acting as a carrier to keep the ink in a liquid state suitable for passing through the jetting process. Once applied to the surface of the material, the solvent evaporates encouraged by the application of heat.

The use of solvents in industry is increasingly gaining a poor reputation and digital print is not excluded from criticism. But the durability and colour vivacity in this ink chemistry was able to offer display producers the ability to output jobs relatively inexpensively onto all qualities of roll-fed materials, including low-cost vinyls and scrims. What was lacking was performance on rigid substrates because of the problems incurred with adhesion and subsequent drying.

SOLVENT-BASED PERFORMANCE

Mild and eco-solvent-based inks tend to contain carriers which have slow drying properties which means that printing machines need to have more powerful drying capabilities. Because of this, the speed of the throughput is best related to the drying time in order to avoid smudging and damaged prints. In general terms, the faster the printer, the greater amount of drying is required. There is

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also a tendency for milder solvent-based inks to react badly when coming into contact with everyday chemicals, such as cleaning fluids; in some cases these inks have been known to wipe off the material surface.

Full, hard or aggressive solvent-based inks don't require the levels of heat and dry faster, softening and bonding or keying with the surface of the material to give a better adhesion. Uncoated and low-cost media tends to perform well with full solvent-based inks as their exposure to a heat source is shorter and less likely to cause damage. These inks also can contain additional ingredients to give glossy, vibrant results and are less likely to be affected when they come into contact with chemicals, grease and dirt.

Whilst solvent-based ink formulations have played an important role in wide-format digital print, it was inevitable ultimately that the disadvantages would start to outweigh the benefits. Since their introduction into the wide-format arena, UV-curable inks quickly became the de facto method of printing direct to rigid substrates because their curing methods can be applied to most materials, thus giving an instant dry finish. These inks do not dry, remaining as they do in a liquid form until they come into contact with a UV light source, at which point they 'cure' – or polymerise and become hard.

UV-curable inks are formulated from monomers, oligomers and photoinitiators. They are not new developments in ink terms, having been used in the screen-printing process for many years, and have made a very successful transition to digital ink-jet during the past decade. Unlike solvent-based inks, they do not contains VOCs or harmful emissions. Nonetheless, no inks are totally "safe", and some users can experience skin irritation and rashes when working with UV-curable products in their liquid form.

Because they can be used with most coated and uncoated surfaces, UV-curable inks are now being employed increasingly on roll-fed materials for applications which require good durability but where it is preferable, or essential, to use inks that are solvent and emission free. It is true that early formulations were often lacking in performance regarding adhesion and colour vibrance but the newer generations of this chemistry have addressed the issues.

UV-CURABLE OPTIONS

Although other formulations are certain to make their way onto the main-stream ink-jet market, print-head developments have been geared towards present-day UV-curable formulations. The ability to output small dot sizes results from improvements in jetting technologies and how they inter-relate to the chemistries being produced for use in all areas of digital production.

New generations of ink show how they are now successfully challenging alternative formulations, with UV-curable products now able to work with fine text in small sizes, photographic quality images and solid areas of strong colour. As a result, all sectors of the display industry, as well as specialist areas such as packaging, labelling and proofing/ prototyping, are turning to this chemistry which has the ability to be used with rigid and flexible materials, including digital textiles.

Today's users look for printing machines which will give them the best of all worlds and, increasingly, areas of production which hitherto haven't been considered. Tomorrow's demands will expect inks that can be used with display and industrial materials as ink-jet machines move into segmented areas where the principles of jetting are the same but the type of application is far removed from being a simple display or graphic.

Making the transition from solvent-based chemistries to UV-curable inks is not difficult, with similar set-up and workflow but with end results that don't require cost-intensive heaters and drying techniques. As refinements have been incorporated into printing machines, print-heads and the inks themselves, so the benefits of this chemistry have been acknowledged by the acceptance of the wide-format and other market areas.

Any printer involved today with digital output, particularly when needing to work with rigid and many industrial materials, will only consider UV-curable ink technology as part of an investment. Its versatility and durability are proven to be second to none, with quality, colour accuracy and vibrance matched by throughput speeds and instant drying.

As the fastest growing ink technology of today, the move across to UV-curable printers from solvent-based variants is certain to grow as display producers continue to discover the benefits. Long-lasting results are complemented by safer and more pleasant working conditions thanks to the lack of hazardous chemicals, and many environmental criteria can be met which will lead to more eco-friendly production. Add to this the fact that most materials can be printed using this type of ink, with stunning and durable results, and it is easy to see why this formulation stands head-and-shoulders above the rest and will remain there for the foreseeable future. ■

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PAD PRINTING TECHNIQUES IN LARGE-FORMAT PRINTING

Julian Joffe covers the benefits and advances being made with this technology

When faced with a large-format print job, most printers will choose between the well-known methods – digital or the screen process. Either choice would be suitable if the substrate is flat and the images are composed of large areas of background colour. Unfortunately those processes will not work all the time. Such is the case when the substrate is rough or undulating or referred to as being three-dimensional in nature. Often manufacturers will look for ways to produce the part flat, then print and change it to the desired shape subsequently, going out of their way to avoid printing a compound surface. This option is both expensive and unnecessary when a more convenient solution exits in the form of pad printing technology.

For the purposes of this article, large-format items consist of (Figure 1) control panels for appliances, the front bezel on televisions, computer keyboards, satellite dishes and similar products. Using pad printing as an alternative should be based upon the following criteria:

- How large is the total image area?
- How many colours are to be printed?
- How great an area does each colour cover?
- Can the images be broken down into more manageable smaller images that fit within the limits of the pad printing equipment?
- Are we dealing with large solid areas of ink or realistic coverage that is broken up somewhat?
- How curved or uneven are the print surfaces?

Large areas of ink coverage are difficult to accomplish and pad printing offers a solution. Using a larger pad printer, (Figure 2) one colour and a single hit are possible; another option would be to break down the image and hit it multiple of times to complete the full image area.

Pad printing machines have advanced to servo-driven CNC controls to direct pad travel and part movement precisely along the X and Y axes for accurate placement and alignment of images, including process colour and half-tones.

EQUIPMENT ADVANCES

Several advances with pad printing equipment have been made to allow large-format printing to become an affordable and achievable option. The advancement in pad printing inks, from primitive hand-milled pigments to inks that are formulated with better flow-control agents, allow adherence to a variety of substrates, with faster curing and durability. Pad materials have also been modified from a gelatine based to a high-tech, fast-curing, durable silicone material. Pads can now be designed and created in any shape and durometer (density) in order to meet specific requirements exactly.

On the other hand, the evolution from open-inkwell to a sealed cup system has moved the industry slightly backwards in terms of the total image area available on a single cliché. The sealed ink cups are limited to a diameter of 10 inches and smaller. The exception is with the development of the cup-slide which uses a longer cliché permitting the image length to far exceed the cup diameter. With the use of a cup-slide, images as long as three or four feet are possible with a single cliché and print pass. One example for this technique has successfully been used in marking catheters for the medical industry.

Pad printers have progressed from manual to motorised, to pneumatic and to servo-driven systems. The integration of computer numeric control (CNC) servo-motor technology was the single most important factor that has made large-format pad printing possible. The servo-driven CNC pad printers (Figure 3) are able to select a suitable pad, step to the cliché area and precisely pick up one of the multiple images from a polymer plate. The image being picked up could be a very opaque white solvent based ink or a UV-curable ink depending upon the choice or requirements of the manufacturer. Large hollow pads allow us to pick up and print much larger images than we did as few as 15 years ago. Inks with better flow-control agents allow us to print smoother and larger surfaces of ink.

Figure 1: Pad printing equipment has proven to be a better choice for decorating a variety of large-format parts

FLEXIBILITY WITHOUT LIMITATIONS

Using technology taken from conventional press techniques, pad printers can be designed with a row of independent pads, a conveyor system to move the parts and clichés with multiple images etched. These systems can operate without limiting where the images are picked, or placed from or in which sequence. The servo-drive gives more

Continued over

Figure 2: Servo-driven pad printing machines with CNC controls can complete a job in a single hit with a large pad or with multiple hits during a single cycle of the machine.

Figure 3: Using a pad printing machine is a quick and effective method for direct printing on large format, irregular and three-dimensional parts.

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Figure 4: One pad printing machine with multiple pads and colours can print a large format part such as this appliance panel in one machine cycle.

Figure 5: Multi-colour printing on an appliance panel using a CNC pad printer.

flexibility in positioning and, coupled with independent pad systems, the ability to print an image wherever it needs to do so.

In printing situations where the substrate needs to be decorated with multiple images of different shapes and sizes, a comparison can be made to the machine tool industry. A CNC machine tool can change cutting tools or drills mid-job, just as the pad printer can also change from one pad shape to another. This process combines several single-colour jobs into a single multicolour run.

Servo and stepping motor drives, adopted in areas of tooling and fixtures, allow the printing of large-format parts as well. Some situations require printing on more than one surface using the same image or a group of images. The creative use of this technology allows a part to be printed in one pass through the machine, even though multiple sides require images. Previously, if a large-format part was printed, smaller machines would be used and the part would have to pass through a series of machines. Each machine would be responsible for decorating a part of the whole – and this involved added labour and space for moving and storing parts during the print operations.

The shuttle-type conveyor with its servo-drive is a perfect combination. It adds an extra axis needed to print large format components with multiple images over a large surface area, while using sealed cups as small as 12.7 cm (5 inches) in diameter. The servo-drive on the printer gives us the positioning capability we need on the Y axis and the servo shuttle provides the positional control for the X axis.

COMPUTERISED ADVANTAGES

The one thing that binds all this technology together is the computer or programmable logic controller (PLC). We now have machines running on industrial PCs, coupled to a PLC, integrating all of the automation. Some pad printers can now memorise production routines, repeat the job, and even recall all the critical settings so that there is a minimal

set-up time. It is possible to network through an Intranet where management can see at any moment how the machines are working in the manufacturing process.

The advantages of pad printing include the ability to print a variety of applications with unique decorating requirements. Uneven substrate surfaces (Figures 4 and 5) present little or no problem to the malleable pad. Wet on wet printing is not an issue because of the limited amount of ink transferred to the surface and the quick drying capability of the inks. The cost of producing the clichés in-house is very reasonable and requires only a small investment in equipment. Pad printing is relatively simple to learn and implement, even an unskilled operator can set up a printer quickly. Finally the imprint quality is superb, and four-colour process is now commonplace with pad printing equipment.

Some of the challenges faced with large-format pad printing are large surfaces of ink coverage which are difficult and sometimes impossible to deal with. The problem can be made easier with half toned clichés to prevent 'scooping' and using multiple hits to improve coverage.

The main reason large areas of solid ink do not print very evenly has to do with the fact that the pad, in order to print well, rolls into the image. If the pad used is correctly designed, it will generally have a wedge-shaped profile of a roof-top or mountain shape. The point of the pad applies more pressure on the ink surface than does the outer perimeter; when picking up a large pool of ink the point zone will usually displace the ink more than the outer area. This creates a surface of ink that is uneven and in many cases will look like the surface of a pond with ripples emanating from the centre outwards.

CHOOSING THE RIGHT EQUIPMENT

If you are not familiar with large-format pad printing, it is important to discuss your application with a qualified pad printing supplier. You may be pleasantly surprised to learn that pad printing equipment is well suited for your application and has many options and accessories available for your specific needs. In-line automation can be used to increase production work-flow including the use of on- and off-loading systems, plus pre-treatment and curing processes.

In the past, pad printing a large image was defined by the limitations of cup/cliché size of the machine. The precision of modern servo-driven equipment and sophistication of the logic systems that control them allow the images to be broken into pieces and colours to be printed with separate hits. The greater the number print-heads on the printer, the more efficient and precise the printing. If the image area is extremely large, another solution is to use a pad printer that has the capability to print the part corner to corner. Some of the newer ones do this, so ask the question before committing to a piece of equipment that cannot meet all of your requirements.

Other printing challenges include jobs in which the overall size exceeds the traversing range of the conveyor or shuttle system holding the parts being printed. In these circumstances, the only option may be to reset the printer to have two separate passes to print the part. While this method is not the most economical, it will get the job done.

The flexibility that pad printing offers in decorating irregular surfaces not only makes this process an excellent complement to screen-printing and digital imaging, but because of the versatility of an effective first choice. Advances in pad printer technology and accessories allow printing on larger formats to be more accurate and cost effective. With any printing method, the technology is continually evolving; it's an exciting field to be in. ■

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HOW TO ACHIEVE CONSISTENTLY HIGH-IMPACT PRINTED GRAPHICS ONTO FLEXIBLE TUBES

Harald Gavin explains how quality can be improved using flexo

Problems with variations in the appearance of flexo printed images on flexible tubes bedevil tube manufacturers; Isimat's innovative dynamic positioning system (patent pending) for flexo printing units in a tube printing machine eliminates these problems and enables tube manufacturers to produce flexible tubes with pin sharp photographic images that are flexo printed in a repeatable industrial printing process.

Extruded flexible tubes are very popular with consumers and consumer product companies (CPCs). Consumers like flexible tubes because they are easy to open, to use and to close after use, and tubes can be emptied efficiently. CPCs value the fact that tubes have a low weight and do not break; and tubes keep their shape during use. A marketing message stays visible until the tube is discarded.

But how easy is it to differentiate tubes? Shape variations of flexible tubes are limited; diameters and lengths of tubes can change, cross-sections can be circular or oval, and tube seals can be straight or curvy. Therefore, graphics have to be the most important differentiator.

Traditionally flexible tubes are dry offset printed. Today, high-speed offset printing presses can print up to nine colours onto tubes at speeds of more than 200 tubes per minute (tpm). Half-tone images and colour gradients can be offset printed, but the printed dots deform and this prevents presses from printing photo-like images. Offset printing transfers a thin layer of ink onto tubes; as a result, images can look dull on dark-coloured tubes.

COMBINING SCREEN AND OFFSET

Screen-printing transfers a thicker layer of ink onto tubes than offset printing. Thus, a combination of offset printing and the screen process can be used for printing images with colour gradients and bold colors. Offset printed tubes are loaded into a screen-printing machine and one, two or three colours are screen-printed into the offset printed image. The accuracy of today's screen-printing machines ensures accurate registration between an offset printed image and the screen-printed image, and outstanding tube decoration can be created this way. However, the disadvantage of combining offset printing with screen-printing is the need for two printing machines. Production and changeover times are longer and, as a result, costs are higher.

During the last ten years, tubes that were only screen-printed have captured more and more market share. Screen-printing transfers a thicker layer of ink than offset printing and the resulting images can look vibrant on dark tubes. As an additional advantage, consumers can feel the ink layers when they touch screen-printed tubes. Advances in UV-curable screen-printing inks, mesh manufacturing and machine design enable screen-printers to print outstanding images, but the resolution of the screen process is not sufficient to print photo-realistic images onto tubes.

IMPROVEMENTS IN FLEXO

The flexo printing process has improved substantially during the last few years; it has the ability to print pin-sharp photo images that outmatch the possibilities of offset printing and screen-printing onto tubes. The ability to use flexo printing in tube decoration gives packaging designers in the cosmetics and personal care industry a whole new range of options in designing high-impact graphics.

Flexo printing is being used successfully in label production. But flexo printing directly onto flexible tubes is significantly different to printing onto plastic film in a label printing machine.

The first tube printing machines in the market with flexo printing stations did not deliver on their promise to be suitable for the industrial tube decoration process. Printed images have to be of consistently high quality with no visible colour variations. This consistency has to apply not only to a complete batch of up to 100,000 tubes but also to batches of repeat jobs.

A closer look at the printing conditions of a tube printing machine shows why it is bound to fail when a flexo printing station is used that is an adaptation of a flexo printing station of a label printing machine.

A flexo printing unit has a short ink train. The ink, as in this situation with tube

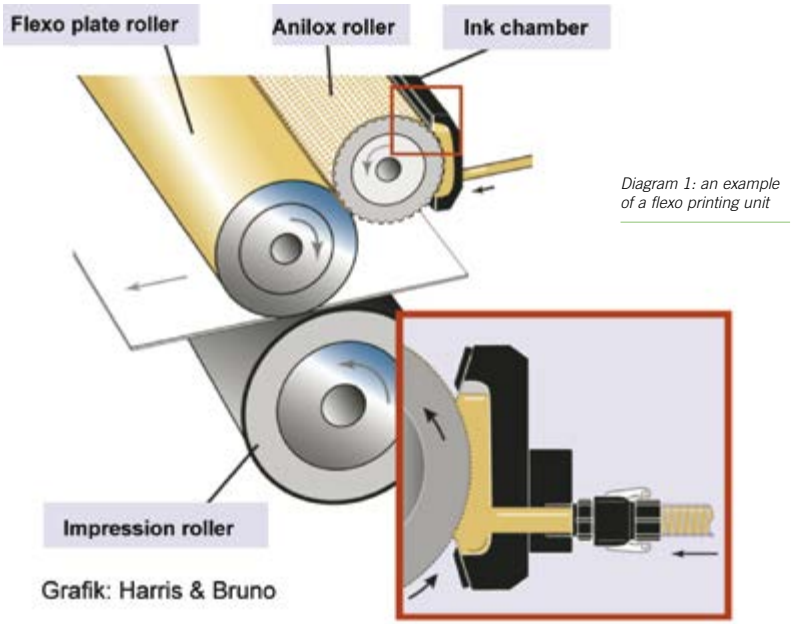

Diagram 1: an example of a flexo printing unit

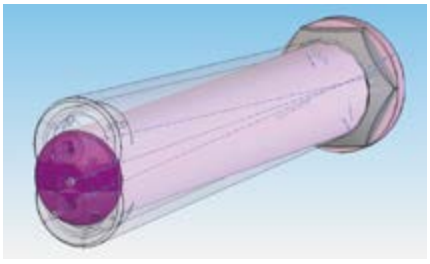

Diagram 2: radial run-out of a mandrel

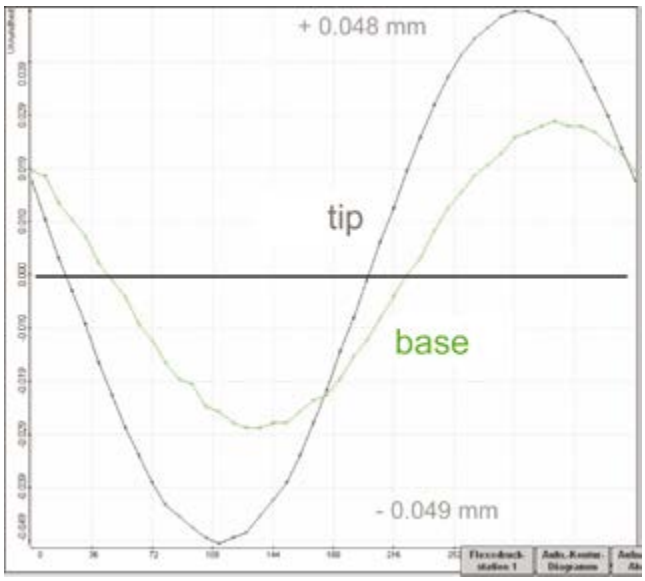

Diagram 3: radial run-out of a mandrel showing its base in the green graph and its tip in the black graph

decoration UV-curable ink, is circulated through an ink chamber that is pushed against an anilox roller. The anilox roller has tiny cups engraved into its surface; these cups fill with ink. The ink is then transferred onto the raised image of a flexo plate that is mounted on a flexo plate roller. The flexo plate transfers the ink onto the substrate in the flexo printing station. The substrate is held on an impression roller (diagram 1).

A flexo printing station in a label printing machine has a fixed impression roller. The plastic film is guided over the roller. In contrast, a tube printing machine has 22 mandrels onto which tubes are loaded. These mandrels are on a horizontal indexing ring and indexed into the flexo printing stations of the tube printer where they act as impression rollers during printing.

Why is it a problem having 22 mandrels successively acting as impression rollers in a flexo printing station rather than having a single fixed impression roller?

THE KEY FEATURES OF FLEXO

Part of the answer lies in the key features of flexo printing. Flexible plates with a raised images and thin inks makes the control of printing pressure essential. Flexo printing requires a 'kiss impression' which is the least possible squeeze between flexo plate and substrate.

When a flexo plate has to print half-tones with a process colour

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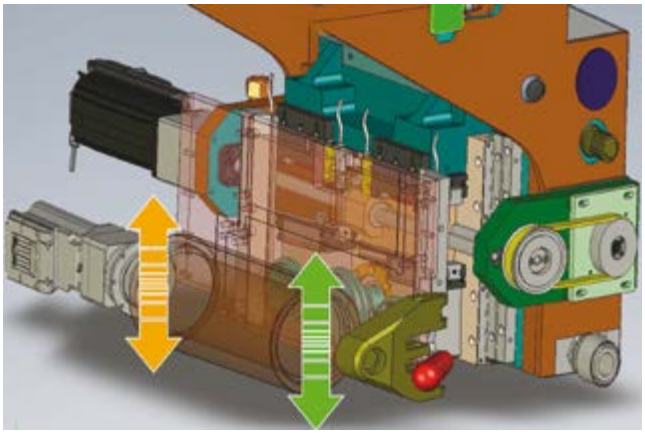


Diagram 4: the two sides of a flexo printing unit need to move independently from one another

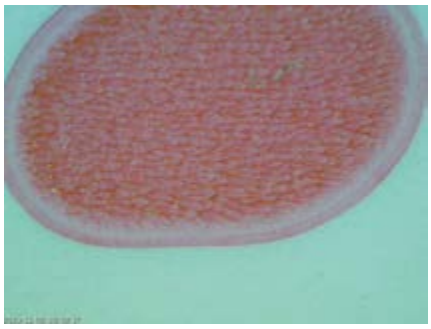
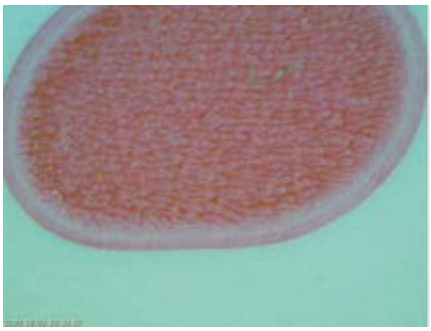
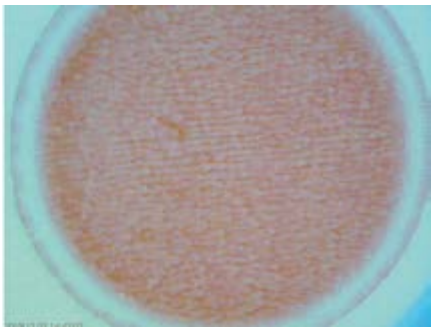


Photo 1: a halo at the edge of a solid





Photos 3 and 4: the left shows a solid on the front of a tube, and the right depicts a solid in the back of the tube, with the differing halo sizes showing clearly the difference in printing pressures

then the plate has to print small dots. These dots will be transferred cleanly from a printing plate onto a tube only if the printing pressure is right. When this pressure is too high then the small dots on the flexo plate get compressed and the area of a dot transferred onto a tube is increased. Increased dots in process colour printing will change the colour appearance of the printed image. The negative effect of too high a printing pressure can also be seen at the edges of solids. High printing pressure squeezes the ink beyond the edge of a solid and this creates a halo; the print area immediately adjacent to an edge has a lighter ink coverage (photo 1).

When the printing pressure is too low then skips (unprinted spots) can occur in a solid block.

A set printing pressure will change when the gap between the flexo plate roller and mandrel (impression roller) changes. Variations of the gap width should be less than ±0.05 mm (the diameter of a normal human hair is approximately 0.05 mm).

FLEXO PRINTING ONTO TUBES

Flexo printing onto tubes is usually done in a hybrid tube printing machine that has screen-printing stations and flexo printing stations. A configuration like this combines the strengths of the two printing processes: flexo printing for half-tone printing of photo-like images, screen-printing for printing vibrant solids and pin sharp texts.

The layout of a tube printing machines (diagram 5) shows the arrangement of the printing stations around a rotary indexing table. Each printing station has its associated UV dryer where each colour is dried before the next is printed. Flexo printing units and screen-printing units are interchangeable in each of the printing stations. Any combination and any sequence of flexo stations and screen-printing stations are possible.

Tubes are pushed onto the mandrels in the loading stations. Two loading stations ensure that long tubes with small diameters are pushed on reliably, because in the first loading station a tubes is only pushed two thirds onto the mandrel and final positioning on the mandrel is achieved with a second push in the second loading station.

Dust has to be removed from tube surfaces which then need to be either flamed or corona treated in order to increase the surface tension for printing. Lacquered tubes can be decorated or tubes can be lacquered after printing. When the last printing station is built as a lacquering station, then a separate machine is not necessary for over-lacquering. Tubes lacquered in the last printing station are wet; they are unloaded from the mandrels and placed onto the pins of a pin chain conveyor which moves them through a UV oven for drying the lacquer. The time it takes for the tubes to reach the UV oven gives the lacquer sufficient dwell time to even out for a perfect surface finish. This dwell time is absolutely necessary because the surface finish of lacquer dried within the machine immediately after application can have an 'orange peel' look. The tubes are unloaded off the pins at the end of the pin chain conveyor and can be moved to a packaging machine.

Diagram 5: a layout drawing of an Isimat hybrid tube printing machine, with pin chain outfeed and pin chain UV oven

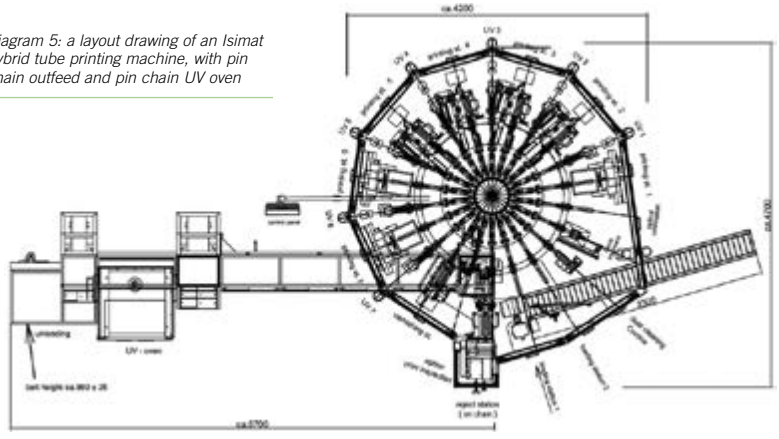


Photo 5: a flexo printing system with a DRP system

Photo 6: the tube on the left was printed with DPR and the tube on the right was printed with DPR switched off

MANDREL ROTATION

The other part of the answer lies in the rotation of the mandrels. Industrially manufactured mandrels, that are cantilevered in the station heads of an indexing ring, can have a vertical radial runout of up to ±0.12 mm when they rotate (diagram 2). In a worst case scenario the run-out of a mandrel causes a change in gap width that is substantially more than the permissible maximum change. A variation like this in the gap width makes it impossible to achieve a consistent printing pressure around the circumference of a mandrel.

Non-printed areas in images printed on tubes are easier to see then dot gain and halos at the edges of solids. An operator will therefore increase printing pressure to ensure that the complete image areas are printed. However, this will cause colour variations, and a critical look at solids will show that not only halos occur but also the halos differ around the tubes. (photos 3 and 4)

The effect of mandrel radial run-out can be virtually eliminated by moving a flexo print assembly, which comprises the flexo plate roller, an Anilox roller and the ink chamber, in such a way that the gap width between flexo plate roller and mandrel is kept constant during printing.

The radial run-out at the base of a mandrel is smaller than the radial run-out at the tip. In addition, the maximum run-out at the tip and the maximum run-out at the base occur at different rotational angles (diagram 3).

Therefore, the two sides of a flexo printing assembly have to be moved independently if the gap width has to be maintained along the length of a mandrel. Two servo motors are required to independently move each side of a flexo printing assembly (diagram 4).

In addition, radial run-out is specific to each mandrel. A flexo printing assembly needs to be moved in a different way for each mandrel; the servo drives of the two servo motors in a flexo printing unit have to have movement profiles that are specific to the mandrel that is currently in the flexo printing station. These profiles have to be changed when another mandrel is indexed into the flexo printing station. At maximum production speed the profiles have to be updated 120 times per minute for each of the flexo printing stations.

A measuring station is built into the tube printing machine to measure the radial run-outs at the tip and the base of each mandrel. These measurements have to be repeated only when the mandrels are changed for printing onto tubes of a different diameter. The data of the measurements is used to calculate two associated movement profiles for each mandrel, one for operator side and one for the drive side of a flexo printing assembly. A servo control system uses these movement profiles to control the movements of the two servo motors that independently move the sides of the flexo printing assembly (photo 5). This dynamic roller positioning is an innovation that received an award for this in November 2010; a patent is pending for this Dynamic Roller Positioning system (DRP) system.

Setting the printing pressure with an active Dynamic Roller Positioning system ensures that even small dots are perfectly printed. When the system is switched off then some areas are perfectly printed, some areas are not printed at all, and in some areas the dots are squashed (photo 6).

Operating a hybrid tube printing machine that features a DRP system does not require any specific knowledge of servo control systems; the complexity of this servo control system is invisible to an operator.

The print quality achievable in flexo printing onto flexible tubes is stunning. With a DRP system, this print quality can be consistently maintained in an industrial tube decoration process. ■

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THE ELIMINATION OF ARTIFACTS DURING THE SCREEN-PRINTING PROCESS

Joe Clarke looks at the goals which printers need to achieve

Within pre-defined limits, screen-printing is the process used to apply the maximum ink volume in a durable, controlled film under minimum pressure at maximum speed. To begin the process, an unindicted co-conspirator builds a graphic for precise form and/or complex functionality. The file is forwarded to a colleague who then picks a low cost mesh based on durability and acutance; then someone applies minimal coats of a low cost stencil and it's off to the ink room for a pail of low cost, durable, sticky-paste.

Armed only with bravado and blade the press operator begins to cobble – to achieve concurrently a hierarchy of dimensional accuracy, edge-acuity and deposition – at any and all costs. While they make a strike-off, you'll recall the mesh was selected to endure while managing the most perspicacious data, and not for printability, volume or deposit. In addition, "they" say: "In order to stick to the stock, the ink must be sticky and tacky." So the operator compensates for this perennial pair of misfits with angle and pressure in order to buckle the blade, which paradoxically creates wet and dry artifacts!

RUNNING RICH OR RUNNING LEAN?

When screen-printing runs lean, dry artifacts entrench (such as pinholes and streaks) when the process is running rich, and wet artifacts float to the surface (including blur and gain). But these two maladies cannot co-exist and their mutual exclusivity is the key to troubleshooting the turbulence in a printed image. A cursory review follows which describes how how blade buckling alters the fluid dynamics to cause both types of artifacts.

Wet artifacts (figure 1) – the image will run 'rich':

1) When the blade is angled or when it buckles. As the size and shape of the funnel are reduced, the blade 'broadcasts' ink into the cells before metering the correct volume.
2) The downward force, or squeegee pressure, is located directly over top of the image but the edge of the blade is not. As a result there is no lower seal (screen-to-stock) until after the ink transfers.
3) The footprint (area of contact between blade and mesh at zero gap) becomes excessive which leads to chattering and poor snap or positive mesh lag.
4) The speed must be reduced to mitigate blurring so the un-sheared ink prints with an orange-peel finish.
5) Concurrently mesh clearing is poor so the operator increases squeegee pressure and forces a further reduction in speed which leads to pooling and mottling.

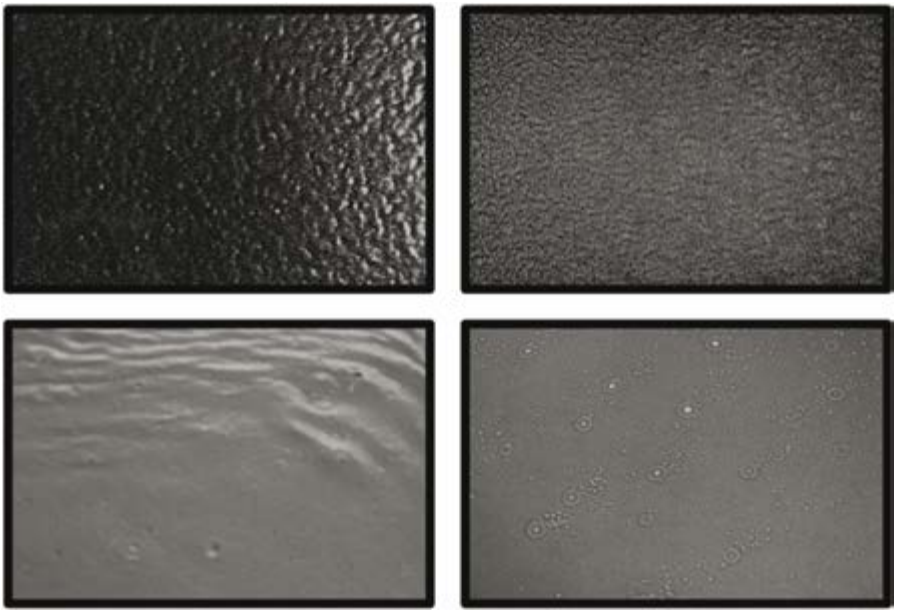

Figure 1: four common screen-printed artifacts, listed clockwise from upper left: orange-peel due to inadequate shear-rate, mottling due to fluid pressure exchanges, sagging due to broadcasting and pinholes due to poor wetting.

Dry artifacts (figure 2) – the image runs 'lean'

1) When the blade is angled or when it buckles – the upper seal (blade-to-mesh) is compromised which limits filling.
2) The capacity of the funnel (dynamic cross-section between blade, mesh and ink-bead extremities) is reduced at which point the buckled blade limits fluid volume.
3) Buckling reduces interface pressure (blade-to-mesh) which limits stroke speed; this, in turn, limits fluid pressure and the inks ability to wet the stock.
4) When the immobile ink reluctantly transfers through the neck of the mesh it loses even more volume.
5) Resultant squeegee pressure is primarily on the stock and press bed – not on the mesh, causing the ink to extrude which prevents it from filling-in below the knuckles.
6) Finally peel (or offset to crown) adds flaws while it rips the mesh out of the sticky ink.

INKS AND THE BLADES TO FIX THEM

Inks which tend to run 'rich' include low yield, low viscosity, thixotropic, high surface-tension fluids which may exhibit both wet and dry

BLADE PARAMETER	TO ELIMINATE WET ARTIFACTS	TO ELIMINATE DRY ARTIFACTS
PUR polymer based on ink system and press speed	•	•
Maximum flexural modulus; funnel and footprint control	•	•
Compression to fit mesh for efficient ink transfer	•	
Maximum funnel for metered ink volume	•	•
Minimum pressure for dimensional accuracy		•
Zero angle (load-over-edge) for immediate lower seal	•	
Chamfered profiles; deposition without degradation		•
Bi-axial compensation to print outside the 'sweet-spot'	•	•

Table 1.

surface anomalies. Inks which tend to run 'lean' proffer dry artifacts typically from high yield, high viscosity, psuedoplastic, high surface-tension pastes. Specific among others, acrylated urethane UV inks feature both wet and dry tendencies observable as 'blotchiness' – segregation of the continuous and discontinuous phases during transfer. Artifacts are always worse on low surface-energy sheets and their presence is exacerbated if and when backlit. Since most often we're stuck with the system and the stock, the best case scenario for the elimination of both types of artifacts is the blade, best selected when based upon the criteria in table 1.

BLADE SELECTION

Traditional, single-axis blade selection has been predicated on 1) price 2) longevity and 3) durometer (density) and although this triune is conspicuous, if you are battling with artifacts you might want to reconsider your priorities. The optimal blade is the one which creates a consistent footprint and a consistent funnel on all points of the screen in both the print stroke and perpendicular directions.

The footprint should be minimal but based upon the screen mesh during dynamic tension. The funnel should be maximal for metered ink volume without fluid constraints. The blade's flexural and compressive moduli need to be based on minimum screen tension, maximum off-contact gap, maximum image size/minimum frame size and maximum feed or cure speed. To maintain dimensional accuracy and speed with an increased ink film deposit, the profile should be chamfered. Although the proper blade is rarely the cause of surface artifacts, selection of the right blade can provide the best on-press solution. But be warned; blade failure occurs the moment it fails to eliminate artifacts in the image. ■

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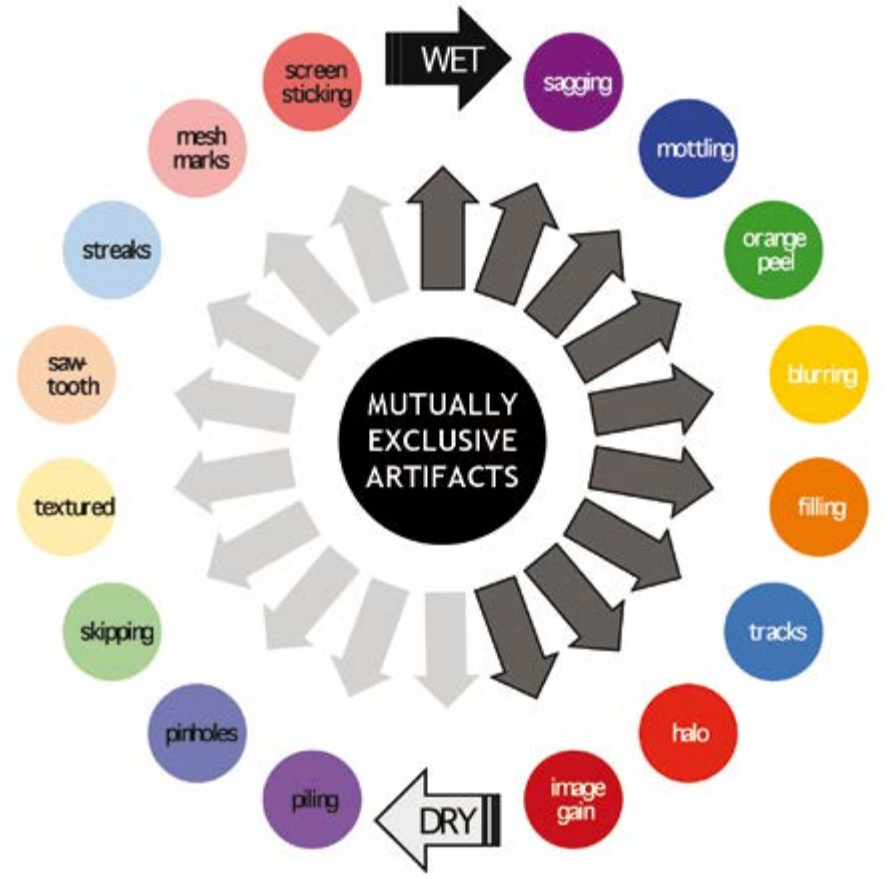

Figure 2: the mutually exclusive relationship between wet and dry surface artifacts. Look to 12 o'clock on the circle and find the black 'WET' arrow pointing clockwise. Next to the arrow is a purple disc labelled 'sagging'. This is the extreme case of wet artifacts wherein a fluid ink is deposited so thickly that it sags and droops into the non-image areas. If you look diametrically opposite to the lavender disc marked 'piling', this flaw is the ultimate thickness of a dry artifact typified by a tall, skinny half-tone dot near the mid-point of the screen. These two problems are mutually exclusive in the same time/space. By dividing the surface flaws into two types it becomes much easier to select the proper blade and then to adjust it properly in order to eliminate artifacts and to get back into production.

HOW TO ACHIEVE GREENER CRITERIA WHEN WORKING WITH WIDE-FORMAT PRINTERS

Vanessa Daelman and Stephan Heintjens discuss the ink and material options which help produce more environmentally responsible production

Being 'green' is a popular ambition among businesses nowadays, partly because business leaders believe it is a valid objective and partly because it is increasingly expected by governments, consumers and business shareholders. For that reason, most companies want to demonstrate that they care about their impact on the environment and consumption of resources. It ties in with being sustainable.

Businesses that pollute and over-consume are not likely to be popular among these external stakeholders or their neighbours and even their own employees. Achieving a truly green status, however, can be more complex than at first it seems. For example, avoiding the release to the atmosphere of potent greenhouse gases from solvents seems an obvious winner. But, if the alternative requires a substantial increase in the consumption of electricity, the benefit may be wiped out by the impact of power generation. To be sustainably green requires a balanced consideration of all the consequences of change, locally and remotely.

In the printing world, 'sustainability' considerations apply mainly to the use of resources, these being primarily inks, media and power – and to the impact of waste produced in the form of gaseous, liquids and solids. There is no escape from the fact that the overall picture is often complex. Thus, simplistic solutions should be treated with caution.

Because, in the printing industry, we only recently started to climb the green learning curve, we are faced with fragmented information and an array of guidance and regulations. There is no one-stop source of rules and regulations; instead they come from European, national and local governments with added input from environmental and health and safety organisations.

Part of the answer is to work with partners that have already studied these requirements and are able to provide facts and information for you and your customers to make a considered choice, balancing business performance with environmental responsibility.

Judged by conventional printing technologies such as offset, screen, flexo and gravure, the printing industry is the fourth most polluting industry in Europe with respect to energy, chemicals and waste. In addition, the paper industry is the fourth largest industrial consumer of fossil fuels, accounting for 40 % of landfill waste and being one of the world's largest consumers and polluters of fresh water.

DIGITAL PRINT'S GREENER PRINCIPLES

Digital printing can help printers become greener. Both toner and ink-jet technologies facilitate print-on-demand, plus a reduction in material use, inventory requirements, storage space and costs (including heating, lighting and logistics). These criteria are based on digitised pre-press operations that eliminate the plate making process with its associated need for cleaning chemicals and generation of waste.

Ink-jet technology, in particular, only deposits the ink droplets on demand; its capability to jet very small scalable drop volumes reduces ink consumption even further. It is generally a clean technology, but whatever ink-jet ink you choose, the chemistries will have an impact on the environment and/or the user. The drive here is to reduce the amount needed to create the required image and to formulate the inks to minimise their environmental impact during production and use.

Ink is an integral part in a printer's environmental audit, from its production through printing to recycling, including recycling of waste ink. The environmental impact of an ink-jet ink is not just in the chemistry of the formulation. There is a choice between inks produced using mineral oils and vegetable oils. The type of ink influences the energy used when printing and the steps needed to meet health and safety requirements.

Biodegradability for inks, coatings and plastics is complex, and there is little scientifically-based life cycle analysis research in this area. The amount of ink present on most print products, however, is normally so small that it does not interfere with substrates that do biodegrade.

Eco-solvent inks have been extremely successful for the display industry

BALANCING PERFORMANCE WITH COST

The decision to choose a particular ink-jet system typically is based on the printer's need to balance performance with cost and, increasingly, environmental compliance. Often performance is the main factor and, to meet customer requirements, a printer may have limited options. Below we examine some of the current inkjet ink technologies and their environmental impact.

All ink-jet inks are made up of four classes of raw materials:

- Colorants
- Resins
- Carriers (water, solvents/co-solvents, monomers, oligomers)
- Additives

The colorants come in two main classes – dyes, which are soluble in the liquid carrier, and pigments, which are solid particles

Dye sublimation inks printed onto transfer paper

dispersed in the liquid carrier. From the environmental impact point of view, dyes are produced via a chemical manufacturing process, while pigments require large amounts of energy to grind the original materials to the correct particle size.

Resins are polymers, and they bind the colorant to the substrate and provide many of the required end-use properties. The carrier is a liquid, allowing the colorant and resin to be printed onto the substrate via the ink delivery system.

Finally, additives are highly refined specialty chemicals that are important in stabilizing the ink and in modifying the physical properties of the ink to suit the inkjet printing system and optimise the substrate interaction.

The majority of aqueous-based ink-jet printing has a low environmental impact; the inks have a water content of up to 85%, with little or no VOC (Volatile Organic Compounds) emissions. However, inks are modified to meet the requirements of the application. The choice of colorants depends on the end use, and media pre-treatment or post treatment may be required. For example, with textile printing, the type of ink is dictated by the fabric substrate, and the colorants can be acid, reactive, dispersed dyes or pigments.

Although dye based textile inks provide flexible ink formulations, have no milling requirements and operate at lower temperatures than other inks, it is important to look at the total print production process. The environmental impacts of dye based textile inks mainly come from the energy required for pre-treatment, fixation, post treatment and wash-off procedures, with associated water usage and dye in the effluent.

Disperse dye inks are also available for dye sublimation textile printing. The fixation process can be either direct-to-fabric via heat fixation (direct disperse inks) or fixation via sublimation (dye sublimation inks printed onto transfer paper and calendered onto the final material). With no pre-treatment and no wash off requirements, there are clear environmental advantages to the transfer method; but there is an environmental impact from paper that becomes waste after the image transfer and the energy requirements for fixation/sublimation.

Solvent inks are now split into different types — full solvent, mild solvent, eco solvent and bio inks. Full solvent inks are widely regarded as undesirable because of the harmful volatile organic compounds (VOCs) they contain. They have been extremely successful for the display industry, but those solvents that bite into substrates for adhesion also evaporate in the surrounding atmosphere during printing and drying.

These VOCs can be HAPs (hazardous air pollutants) and/or TAPs (toxic air pollutants) and can be subject to low PELs (personal exposure limits). Today, ink manufacturers are selecting different solvents and taking more care to provide end users with the relevant information in the related material safety data sheets (MSDS). While equipment is available for ventilation and solvent vapour capture to bring solvent levels in the working environment far below the accepted safety levels, there are also solvent inks on the market that do not require air purification.

More recently there have been developments with bio (organic) inks that are made from renewable sources, such as corn, palm or soy beans. The solvents can be biodegradable and have lower associated PELs.

Continued over

Calendering of dye sublimation prints onto the final material

The new generation latex inks are pigmented and water-based, containing at least 50% water. They have low VOCs but require special ventilation, de-humidification and air conditioning. Since latex inks contain at least 50 % water, printing on printing on non-porous substrates can cause coalescence and the printing speed needs to be low enough for the water to evaporate.

Precise temperature control is critical as ink spot size can vary with temperature. The printing and drying process on latex printers is very energy consuming because multiple heating zones drive the evaporation process. A first heating zone evaporates the water and the second heating zone cures the latex component. In order for the latex ink to achieve its full characteristics, it is imperative that, first, all water is evaporated. Only then can the latex particles coalesce to form a continuous polymer layer, which bonds to the substrate surface.

Media choice is restricted because of the heat, to avoid effects such as cockling or wrinkling. Further ink developments are required to reduce energy consumption and these will (as usual in ink-jet business) lead to other compromises.

UV-curable inks are seen as a green alternative to solvent-based inks and have gained popularity in the wide-format market. Their advantages are substrate versatility (rigid and flexible) and the instantaneous curing process. These inks contain acrylate monomers and oligomers, photo-initiators and pigment colorants.

After application to the substrate, exposure to UV light causes the photo-initiators to start cross-linking, transforming the monomers into polymers. UV- curable inks contain no VOCs, but they do exhibit low PELs, as uncured ink may cause skin irritations. The most important issue with UV curing is to ensure that the UV ink has been fully cured. Importantly, the design of the printer should avoid the risk of operators being over-exposed to UV and take care of uncured ink fly. In this respect, a fully covered UV machine is the preferred choice.

MATERIAL OPTIONS

The environmental mantra is 'Reduce, Re-use, Recycle', in that order, representing a product responsibility paradigm shift from cradle-to-grave to cradle-to-cradle. Recycling is a market-based activity. It requires technology to recycle at reasonable cost, market demand for recycled products and a sufficient volume of material in the waste stream to support the enterprise. If these criteria are not matched, the waste will remain as waste.

Paper is still the most popular medium for most printing jobs, even with a wide-format digital ink-jet printer. Paper recovery and recycling is well established. The efficiency and technology is improving all the time, for example with processes to de-ink paper during recycling. For paper and cardboard, certification for sustainable forestry management has been available for a long time. The aim of the FSC (Forest Stewardship Council) set up in 1993 is to preserve the forests and their function as living environments offering sustainable resources and as a buffer against climate change.

PVC is a popular substrate for wide format printing. It has been the bad boy of plastics in the past, but the PVC industry seems committed to developing a sustainable future and is working to increase recovery and recycling of PVC as well as working towards being a carbon neutral industry. PVC can be safely incinerated and the heat generated can be used to generate energy.

Other plastics can be either classified as fossil fuel plastics, when derived from petroleum, or as bio plastics, when derived from renewable resources such as vegetable oil or corn starch. Some bio plastics are designed to biodegrade, but others are not. Degradation as such, however, is also not a straightforward matter. A clear distinction needs to be made between bio-degradation and photo-degradation.

Bio-degradation means that a substance can be degraded by microbes under suitable circumstances. In practice, this means under the tightly controlled conditions of industrial composting installations. Usually, it does not mean that efficient composting is applicable to home composting. Photo-degradation means that degradation is not initiated by microbial action, but rather by ultra-violet sunlight and oxygen.

Although both types of degradation can be applauded from an environmental point of view, there is criticism within the industry that so-called photo-degradable materials do not meet the internationally agreed composting standard, EN13432. This standard has been published by the International Organization for Standardization (ISO) and is recognised in many areas/countries: Europe, Japan and the US. The reason for the criticism is related to the fact that photo-degradation in some cases may be a very slow process, and not yet efficient enough to be considered as a method to dispose of rest materials.

Many such synthetic plastics are great for outdoor promotions, for example of 30 to 60 days, but are not always recyclable. Some may linger way beyond their usage period and unless actively recycled will become waste.

Fabrics are generally eco-friendly. Some fabrics, like paper, are manufactured from plant-based materials such as cotton. Other popular fabrics are synthetic polyester and polyamide. In the display industry fabrics are often preferred for their portability, being lightweight and easy to fold without unwanted creasing. The environmental impact of fabric media stems mainly from the print production processes such as pre-treatment, fixation and wash-off.

Print buyers and print consumers are increasingly aware of printing's environmental impact. These customers want wide format ink-jet printers to do more than simply to print on recyclable/recycled materials.

They are looking for printers to operate in a more efficient and sustainable manner, from start to finish. Making the right equipment and workflow decisions has thus become even more important. Printers are looking for ways to compress the entire production cycle, use less material and produce lower waste while ensuring profitability, quick turn-round and high quality.

GOALS AND FACTORS

The following key goals can help in going green.

- Reduce energy use. Building energy consumption is around half to one third of that used for production. Readily available

savings often include lowering heating levels, not lighting areas not in use, excluding draughts and heat loss and computerising control of heating, ventilation, air conditioning and other support systems. New lighting technologies can reduce the energy needed by 50%. Include energy consumption when selecting new equipment.

- Assess sustainability when selecting inks and coatings. Newest ink sets show significant improvements from the reduction of VOC emissions, while UV-curable inks have a good environmental profile from their absence of VOCs and the low energy needed to cure them. Ink manufacturers are increasingly using renewable resources. Together with printing equipment suppliers they are also assisting printers to recover and recycle inks and solvents.
- Reduce the use of materials such as paper and opt for environmentally products such as substrates with a minimum fraction of recycled content or environmentally certified papers from the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC).
- Reduce waste: less material in means less waste out. Waste reduction plans can improve business efficiency by reducing manufacturing and waste disposal costs without compromising quality. Waste is not just solids and liquids; it is also wasted material and time.
- Comply with the health and safety rules for employees and plant/facilities regulations. Emissions of chemicals such as ozone, VOCs and dust should be strictly controlled; aim to be well below regulatory requirements. Check if personal protective equipment is needed as chemicals in some inks might lead to skin irritation. Set up clear unambiguous information on how to work safely. Last but not least, always motivate to contact local authorities to ask for advice about local guidelines and regulations in function of the supplied MSDS sheets.
- Watch logistics: use lightweight materials and keep packaging to a minimum to reduce transport energy and costs. Use recyclable materials whenever possible. Minimise workflow distances and use best practice operating procedures to improve internal transport efficiency.
- Work with environmentally responsible suppliers that ensure their products conform to all applicable chemical legislation and are available for advice on meeting end-user eco criteria. Look at new technologies to broaden your options for going green to conserve natural resources and to enhance efficiency and profitability.
- Explain your green benefits and be prepared to back up your claim.

Always make sure that you double check the marketing statements of manufacturers. Also check that manufacturers' environmental statements are indeed applicable in your country. It frequently happens that manufacturers tend to use US standards for their promotion, knowing that US standards often have a different focus versus European standards.

When evaluating wide format ink-jet printing equipment, ensure to make a thorough analysis of all key factors that will determine the carbon footprint of daily production and, last but not least, your performance and return on investment.

Key factors to take into account :

- Standard configuration of the printer, machine price and possible options
- Ink consumption details
- Electricity consumption of the printer during start-up and during printing
- Capability to print on recyclable substrates, such as non-PVC self-adhesive media and recyclable paper
- Necessity of special work environment equipment, such as the need for an air conditioner to extract heat produced by a printer
- Serviceability of the printer and required maintenance cycles
- True performance of a printer (advertised speed versus print quality, throughput, ink and power consumption)
- Whether the printer has features on board avoiding 'trial and error' printing to reach acceptable print quality
- Ensure that your supplier provides correct Material Safety Data Sheets (MSDS), which are relevant for the region in which you are located. ■

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Agfa's :M-Press Tiger combines the benefits of screen-printing with wide-format ink-jet

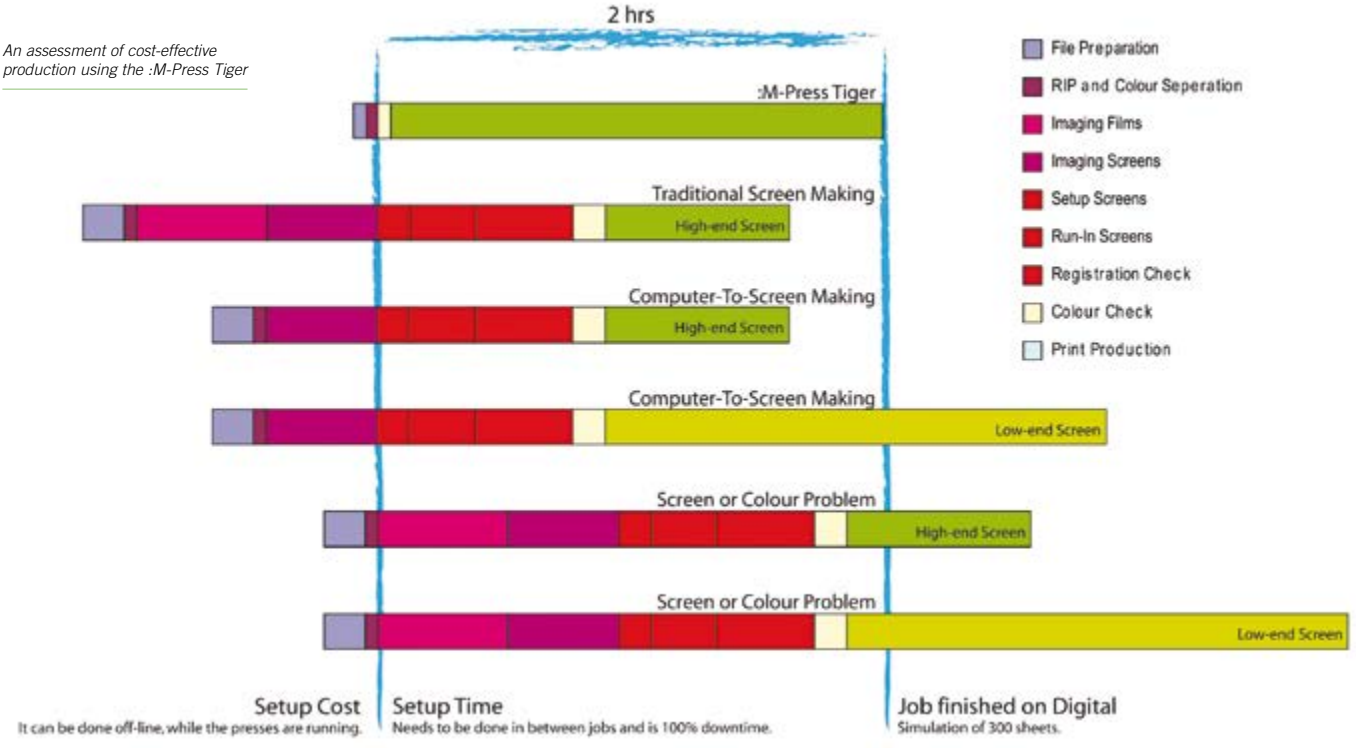
A MERGING OF PROCESSES LEADS TO HIGH PRODUCTIVITY

Combining screen-printing with ink-jet technology in a single machine is detailed by Sophie Matthews-Paul

Increasingly, display producers and screen-printing houses are demanding a solution which will provide the versatility of ink-jet with the output capabilities of the screen process in a single machine. The Agfa :M-Press Tiger combines these techniques with the result that users can now print all their interior and exterior applications at the same throughput speeds as multi-colour screen lines, but with the benefits that digital ink-jet can bring to production.

The Agfa :M-Press Tiger is a logical and straightforward printer to set up and use. However, the reasons behind the power of this machine include its high levels of technology and engineering, both of which have played a major role in its overall development. Combined with its established workflow software and rugged design, the result is a true work-horse solution for display printers. The versatility of an ink-jet workflow is applied to traditionally screen-printed applications so that options, such as variable data, can be introduced into longer runs to create personalisation. Because this unit incorporates UV-curable inks, prints with a wide colour gamut are ready for use immediately, and this speeds up finishing processes and despatching.

There are also significant cost benefits for users migrating to the Agfa :M-Press Tiger from analogue printing methods. From a practical viewpoint, screen-printers are now able to move their cross-over point to reap the benefits of digital production on much longer run lengths than have previously been possible. Minimising the numbers of screens, and associated make-ready, wash down and reclamation, and incorporating chemistry-free



An assessment of cost-effective production using the :M-Press Tiger

ink-jet into applications also saves on overall expense. Additionally, this cuts back significantly the number of man hours involved in job preparation and change-over, as well as reducing the floor area required when using the screen process for elements within multi-colour applications. These factors impact on both economical and ecological principles, and are important for businesses wanting to move to more cost-efficient and environmentally friendly practices.

MERGING OF TECHNOLOGIES

Agfa's :M-Press Tiger is the result of merging together the essential elements required by print shops who need reliable high-speed output. Agfa Graphics integrated Thieme's capabilities within the screen process arena with its own ink-jet developments. This combination is complemented by the inclusion of precision print-head controllers and greyscale variable dot technologies, Agfa's :Anuvia UV-curable inks which provide an extremely wide colour gamut, and Agfa Graphics :Apogee workflow software that optionally includes true VDP (Variable Data Printing) within its functionality.

This powerful combination has resulted in a solution which can be used to print the highest and most consistent quality direct to a vast range of rigid and flexible materials at extremely high speeds. The inclusion of the Thieme screen bed with Agfa's ink-jet expertise means that, by incorporating this analogue capability inline, the machine can also be used to print many of the specials available within the screen process but not available elsewhere in industrial wide-format ink-jet.

One of the primary benefits of the :M-Press is the fact that there is virtually no set-up time. Yet, in performance terms, it matches a typical multi-colour screen-printing line. This means that there is no compromise on productivity when adding spot colours, silver, gold, varnish and a highly opaque white ink. Thus, where an application incorporates both ink-jet elements and screen-printed areas, users gain from fast and efficient throughput and the ability to merge personalisation which only digital techniques can provide.

CONFIGURATION

The :M-Press Tiger is constructed using the standard feeder for all Thieme multi-colour screen-printing lines. This means that all typical screen substrates are handled efficiently and easily. The feeder's patented gripper system within the automatic media transport ensures that sheet-to-sheet registration is the most accurate on the market, at 0.2 mm. Because the inlet has been precisely designed and engineered, users can be confident that this fine alignment tolerance is consistent to allow in-register overprinting and automated finishing.

Designed to be the fastest production printer of its type, the :M-Press is supplied with a universal vacuum table that can be zoned into 48 separate areas in a number of configurations to cater for different media sizes, and which reduces the necessity for taping the bed to size. It also incorporates an industrial UV-drying unit and conveyor to carry the finished output to the exit section of the unit. A heavy-weight stacker piles the sheets onto a pallet, ready for unloading either manually or via a forklift.

The digital heart sits in the printing unit. Agfa built the inkjet shuttle in the :M-Press Tiger, and it is this that allows the :M-Press to combine the finest quality with the highest speeds available in the market. The system contains an array of 64 piezo-electric print-heads which have been co-developed with Xaar (named Agfa's UPH 2 – Universal Print Head). Each of these print-heads contains 764 ink channels which produce 30 million droplets per second in droplet sizes from eight to 40 picolitres. Typical hourly output is 100 to 165 sheets at 1.6 m wide and 2.6 m long and this requires high levels of information being passed to the print-heads in the shortest possible time.

The large number of print-heads in the :M-Press is vital to performance in order to enable very high throughput speeds. These are mounted in the shuttle in a wide array, and enable the machine to achieve its extremely fast production rates. The shuttle, with the array of printheads, moves over the pages back and forth one, two or three

Continued over

times depending on the quality mode. In this way the image on the substrate is printed over the full width of the page in two, four or six passes during this procedure.

This wide range of picolitre sizes means that text as small as 4pt, smooth gradients, and strong, solid areas of colour can all be rendered accurately with no banding. The 64 dual-colour heads are designed to jet even the smallest droplets, thereby eliminating any graininess, and to produce images that match offset quality. These print-heads use reliable greyscale technology with variable droplet sizes. It takes away the need for additional light ink colours to produce accurate and delicate skin tones and graduations. Depending on the pulse, physical drops are produced at a specific frequency, or modulation, so that the most efficient amount of ink is applied to the material surface for optimal precision and coverage. This results in a reduction in the amount of ink needed for a job and therefore better drying and mechanical resistance with the same colour quality.

CONTROLLING THE PRINT-HEADS

As each individual print-head works with 80 Mbps of information, hence the entire printer works with a constant flow of information which equates to more than 5 Gbps. Because this exceeds the capabilities of USB and Firewire transfer rates, the :M-Press utilises four fibre-optic cables, each with a flow rate of 1.25 Gbps to process the data necessary to drive and control the print-heads. Agfa worked with specialist company Technolution, from Gouda, to perfect this transfer requirement and develop its bespoke printer controller which connects the computer with the machine itself.

The print engine controller, or PEC, is a PCI card which contains programmable logic and plugs into an expansion slot on the computer. When the printer is ready, it retrieves the required FPGA (Field-Programmable Gate Array) image data directly using the DMA (Direct Memory Access) from the memory of the computer and places the information on a 400 Mbps parallel bus.

The FPGA is a programmable logic device which is designed to be programmed subsequent to its manufacture so that it can be tailored for very specific requirements, such as the :M-Press print-head control. This means that it is not restricted to a predetermined function within the hardware but can be configured for exacting tasks that require an application specific integrated circuit (APIC). In the Agfa :M-Press the FPGA is used to acquire the information from the bus which is required for both the colours and for the print-head control.

As every PEC FPGA can control up to 16 print-heads, two individual PCI cards are used to convert data so that, on the :M-Press's shuttle, the fibre is split into 16 electrical connections, each serving a head. Thus, the print-head converts the control signals into electrical pulses to drive the piezo-electric crystals in the ink channels and deliver 40,000 droplets/second with precision accuracy.

HOMOGENEOUS INKS

Agfa Graphics designed and produces the :Anuvia HD inks for the :M-Press. The requirements set to these inks are very particular. They have very homogeneous properties to allow for efficient and consistent pumping from printer's tanks, flowing through to the print-heads themselves. As the viscosity of the ink depends on the surrounding temperature, a conditioning system is also built into the :M-Press to hold the ink at the correct temperature. Each print-head contains a water coil to keep this temperature constant, with sensors monitoring the head to achieve this and, at the same time, ensuring that any air bubbles are eliminated which could cause nozzle blockages. The :Anuvia inks are suitable for gloss, semi-gloss or matt printing across most materials and surfaces. These options are easily selectable by the user for each job, with no ink changes required, and no disruption caused to productivity.

The :M-Press lays down very thin layers of ink, and together with the cross position of the print-heads, this eliminates the risk of banding ink, and results in smooth overprinting and much better image quality. This cross positioning enables the print-head assembly to be mounted in such a way that maximum accuracy is maintained on the head carriage framework. For industrial print applications, the precision of the throughput is determined by the width of the print-head shuttle and, as the :M-Press uses a wide array and larger shuttle, it is vital that the print stroke and throw distance, or the distance between the printing elements, is controlled to exacting tolerances.

Agfa's specially configured shuttle is supported by a double-beam construction which provides the vital stability needed when running the :M-Press at high speeds. This supports the print shuttle at both ends, ensuring the accuracy of the print-heads and droplets, so that fast speeds do not compromise high quality.

:Anuvia inks are formulated specifically to promote high fade resistance for long-term exterior applications, while also retaining light-fastness and impact for interior installations. They have been developed to produce a neutral grey balance, accurate colours and perfect edge sharpness as well as extended durability in outdoor environments. The colour gamut is the widest in its class resulting in a colour reproduction

A bird's eye view of the Agfa :M-Press Tiger's configuration

on print which far exceeds the ISOcoated V2, the offset gamut. A wider colour gamut also reduces the need for using special colours.

Agfa has many years of experience, both in colour management technology and in photographic dispersion stabilisation. This in-depth expertise contributed to innovate specific capabilities of the UV-curable ink formulation. But there are also other requirements such as adhesion and fast curing that are vital factors which make :Anuvia inks suitable for use with a very broad range of flexible and rigid medias, including PVC products, PET materials, corrugated substrates and aluminium composites.

The properties of :Anuvia inks confirm a jetting viscosity of 7.5 – 10.5 mPas (millipascal seconds) at an operating temperature of 45ºC with a surface tension of 23 – 26 mN/m (millinewton/meter). This describes the attributes necessary for the high performance characteristics of the formulation, and its behaviour in mixed environments is determined positively as a direct result of these criteria.

:Anuvia HD inks have also been developed according to Agfa's strictly enforced environmental policies and responsibilities, and the chemistries used have been chosen

for their low toxicity and safe handling as well as their colour fidelity and ease of handling. The :M-Press products have a shelf life of 18 months when stored appropriately, and feature complementary efficient packaging, supplied in 5 litre cans in such a way that there is no risk of accidental mixing of colours.

SOFTWARE CAPABILITIES

The :Apogee workflow solutions manage pre-press and RIP functions, and integration is based on the JDF/JMF (Job Definition Format/Job Messaging Format) principle which is increasingly being demanded in wide-format digital printing. This capability automatically integrates with production processes by standardising job tickets and carrying job details like customer information and application data, ICC profiles and output characteristics.

:Apogee incorporates complete workflow options for a seamless production operation from start to finish. Originally developed for Agfa's modular UV-curable :Dotrix, the addition of :Apogee Vibe brings true variable data options to the :M-Press Tiger in response to demand from users wanting greater personalisation capabilities. Through the workflow the :M-Press Tiger now appeals to an even broader range of market segments which, hitherto, have not been able to benefit from customisation and greater flexibility in their applications.

Integrating :Apogee Vibe into the Agfa :M-Press is intended to reduce pre-press time considerably, particularly in applications where RIP time and data transfer needs to be kept to a minimum for variable data and personalised applications. This latter capability means that, with customised elements only being introduced at the very last moment of the printing process, throughput is not compromised on long runs where perhaps only a line of text or a versioned graphic needs to be changed in each print.

When using Vibe's data handling and application capabilities, defined areas of the full surface size can be variable from sheet to sheet, so that VDP can be represented using an image, text or a line graph without compromising on production speed. Another special mode is for multiple-up pages to contain more than one document on the printed page, with each page displaying a portion of the variable elements. These features allow for optimising the print capacity on press without slowing down the overall throughput.

IT ALL BELONGS TOGETHER

The :M-Press Tiger is a hybrid system which can be configured in a multitude of configurations, with the most typical having automatic loading and unloading. Optional additional modules include an inline screen-printing facility situated after the ink-jet unit for overprinting of spot colours, metallics or varnish. Equipping the print line with an extra screen-printing bed prior the ink-jet section allows special colours to be put down before the digital step. For those wanting to print a wide variety of different substrates, the roll-away automatic feeder can alternatively be specified with a manually fed belt-feeder, or with an air-assist table for easy manual feeding of even the largest sheet.

With the :Anuvia inks and the :Apogee workflow software, the result is the only true digital alternative to many traditional screen printing systems. It offers the same output benefits as a multi-colour screen-printing line, with a similar turn-round time for each job, yet with lower costs and higher quality. However, as the digital element of the unit doesn't require screens for producing CMYK because it uses ink-jet, the :M-Press Tiger offers a realistic, practical and cost-efficient alternative to current technology, and this is vital for today's businesses as it allows printers to be more flexible and more versatile in their application offering. ■

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ADDING METALLIC COLOURS TO WIDE-FORMAT WORKFLOW

Timo Keersmaekers explains how to include special effects into a graphic

In the past, gold and silver effects could only be produced by complex printing systems such as offset, flexo and screen-printing. It is necessary to make plates or screen-printing frames for all these techniques – and this proved to be an expensive method, especially for small print runs. They also require a great deal of professional expertise. Nowadays, however, printing metallic colours can be both cost-efficient and easy. The answer lies in wide-format printers.

ADVANTAGES OF INK-JET PRINTING

One of the main benefits of ink-jet printing is that it does not use plates. This means that the number of colours is not restricted by the number of plates. What's more, small runs can be printed without any extra costs.

Another advantage of ink-jet is that, unlike other techniques, there are no limits to the size of the print. The same design can be printed on both a small sticker and a gigantic banner without any problems.

The third great advantage is that this method uses eco-solvent inks so that it is possible to print directly on vinyl and films that do not have an ink-absorbent layer.

WIDE-FORMAT PRINTERS WITH METALLIC INK

There are currently several printers on the market which can use silver metallic ink. A whole range of metallic colours can be created by combining this ink with CMYK. Gold, bronze and copper are just a few examples.

Metallic colours are often used in printed matter around festive seasons, such as December and for Valentine's Day. They are also popular colours in advertisements for perfume, make-up and other luxury products. Metallic colours add an eye-catching and luxurious touch to prints.

Metallic ink isn't difficult to generate

A typical application which benefits from Roland's metallic ink capabilities

Metallic ink is still new to most sign-makers, but Roland DG is convinced that it will quickly become a standard colour for ink. Metallic is already being used frequently in small-format printed material, but the ink offers so many possibilities that wide-format printers will also be equipped with it in the near future. This ink can be used in all sorts of prints including Christmas decorations, advertisements for luxury products, textile transfers, car stickers and countless other applications. There is an abundance of creative possibilities. Furthermore, clients say that these colours are helping them to increase their turnover. People are often prepared to pay more for prints containing sparkling metallic colours.

INCORPORATING METALLIC COLOURS INTO A DESIGN

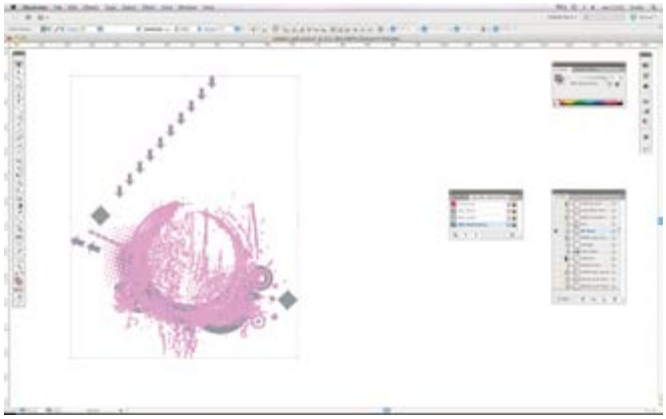
A selection of machines in Roland DG's range include options which can use metallic ink. The latest development is the VersaCAMM VS series of combined printers/cutters which are available in versions that include both metallic and white ink sets. VersaWorks, the accompanying software, ensures that metallic colours are printed perfectly.

VersaWorks includes a library of 512 metallic colours. Designers can easily incorporate the colours in a design by importing this library to Adobe Illustrator or CorelDRAW. All users have to do is click on the colour they want. It is also possible to define metallic tints and add them to the library.

CorelDRAW has included both of Roland's colour libraries – the metallic colour library and the standard Roland Color Library – as standard colour palettes. As a result, there is no need to import the Metallic Color System Library separately to CorelDRAW X5 and later versions of the program.

It should be noted, however, that the metallic colours on the computer screen are

An example of a library pattern



Applying silver elements to a file using Adobe Illustrator

not a 100% match for the final printed colours. Therefore, VersaWorks has an option for printing colour cards. Users can print the entire colour library on different print materials and use these cards as a reference to make sure that prints turn out as expected.

CREATING PATTERNS WITH METALLIC INK

In addition to the colour library, VersaWorks also has a library of 26 metallic patterns. Waves, checks and circles are just a few of the options. Just like the metallic colours, these patterns can be incorporated into a design so that designers do not have to create a pattern themselves.

GRADIENTS IN METALLIC

Roland DG's metallic printers can produce metallic gradients. This is an important improvement on many conventional printing techniques which gives designers greater creative freedom.

TWO PRINT MODES FOR SUBTLE AND STRONG METALLIC EFFECTS

Metallic colours can be printed in two ways, either blended or layered. In the blend print mode, the colours and metallic ink are printed together. In layered mode, metallic ink is printed as an under-layer and the colours are printed on top.

The effects vary according to the print mode; the blend printing technique gives subtle metallic effects and the layered mode produces strong metallic colours. Users can select a print mode depending on the desired effect.

Continued over

Inclusion of metallic inks produces an unusual decoration for an iPad

Window graphics benefit from the inclusion of metallic and white elements

A DETAILED EXAMPLE PRODUCED USING ADOBE ILLUSTRATOR

The following design illustrates several aspects:

1. Colour libraries
2. Silver
3. Other metallic colours
4. CMYK colours
5. Metallic gradient
6. Metallic pattern

1. Colour libraries

Roland DG has a standard colour library: the Roland Color Library. A colour library containing more than 500 metallic shades has also been developed, and this is called the Metallic Color System Library. We imported both libraries in Adobe Illustrator and opened the libraries.

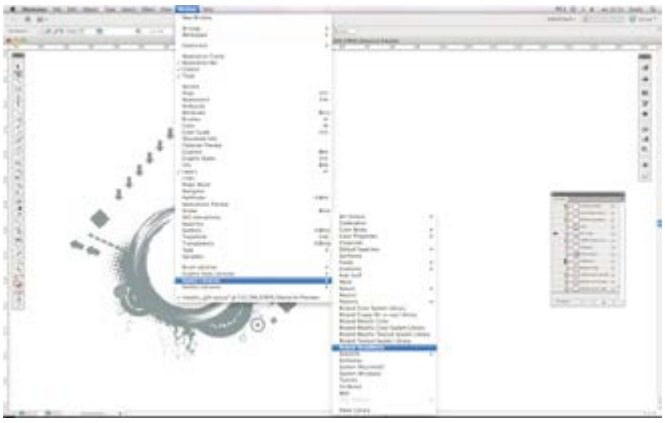
Note: CorelDRAW has adopted both colour libraries from Roland DG as standard colour palettes. You therefore do not have to import them from CorelDRAW X5 and later versions. They can be accessed by clicking on Window> Colour palettes> More palettes

2. Silver

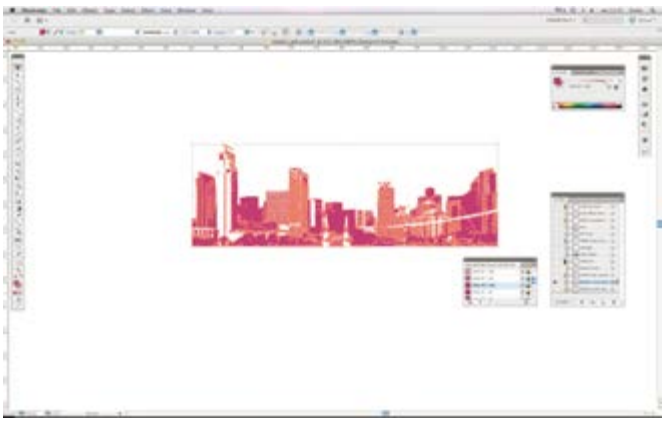
We selected the elements that we wished to colour silver. The simplest way to apply colour is by clicking on the colour RVW-MT-Silver in the metallic colour library. This silver is a mixture of colours. The silver is a softer shade.

In this example, we chose a pure silver colour, using the VersaWorks library. We imported it in the same way as the libraries and selected RDG_MetallicSilver in the palette. The colour that will be printed is 100% silver. It is not a mixed colour.

The Roland VersaCAMM VS-420 is one of the options available with metallic and white inks



Applying silver using the VersaWorks library imported into Illustrator's swatch libraries



The metallic colour library is used to create this image in metallic pink

3. Other metallic colours

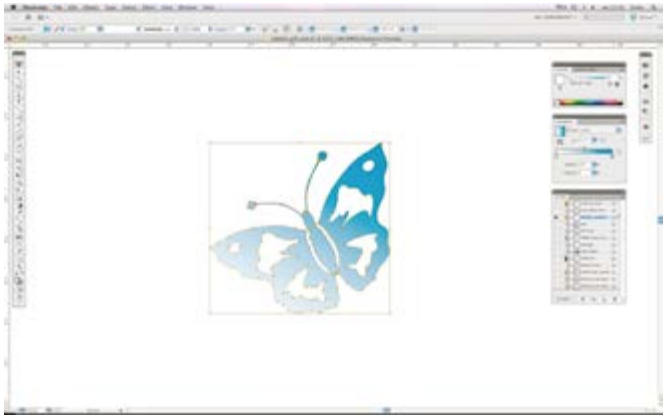
We selected an image that we wanted to colour in metallic pink. We applied the colour by clicking on RVW-MT-160 in the metallic colour library.

4. CMYK colours

We selected the elements that we wished to have in a normal colour (non-metallic). The easiest way to apply CMYK colour is to select the colour you want in the Roland Color Library. When printing, Roland DG's software (VersaWorks) knows that this colour does not contain a metallic value. We chose the colour RVW-BK22A.

If you want to give the text a CMYK value, you must state that no metallic may be printed behind the colour. To do so, set the metallic value (RDG_MetallicSilver) at 0%.

CMYK colours are selected from the Roland Color Library



Metallic gradiants can also be incorporated

The Roland Metallic Texture System Library contains patterns and textures

5. Metallic gradient

We selected the element to which we wanted to give a gradient. We made a metallic gradient by going from 100% metallic to 0% metallic. From 100% metallic to white does not work optimally, as metallic is still printed behind the white.

6. Metallic pattern

We selected an element to which we wanted to apply a metallic pattern and opened the metallic texture library (Roland Metallic Texture System Library). We selected the pattern RTSL-MT-Glitter10. We chose a white background, so that the pattern would stand out clearly. The text written over the pattern will disappear when it is printed. ■

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REPRESENTING THE CUTTING EDGE OF SIGN AND DISPLAY PRODUCTION

Sophie Matthews-Paul assesses why decades of knowledge need to be applied to today's cutting table technologies

The incorporation of cutting tables within sign manufacturing and display businesses is not a particularly new phenomenon; even in the earliest days of working with rigid substrates, routers and milling machines were used as part of many industrial and decorative production processes. These systems increased in automation when CNC technology became simpler to incorporate into an increasingly computerised world. Based on the principle that the equipment takes data and converts it into x, y and z axes, this operation has been complemented by easy to use software that enables vector shapes and outlines to be transcribed easily into accurate cutting paths for a variety of applications. Today we take this capability for granted because we know our machines can handle this efficiently.

In Specialist Printing Worldwide, issue 3 2010, we took a close look at EskoArtwork's software which simplifies the pre-flighting of PDF files, minimising material waste drastically and incorporating all the cutting parameters required before a print job is sent to the RIP for printing and finishing. In this article, we discuss the merits of a good computerised cutting table and how it brings versatility, time and cost savings to companies working in the sign and display markets.

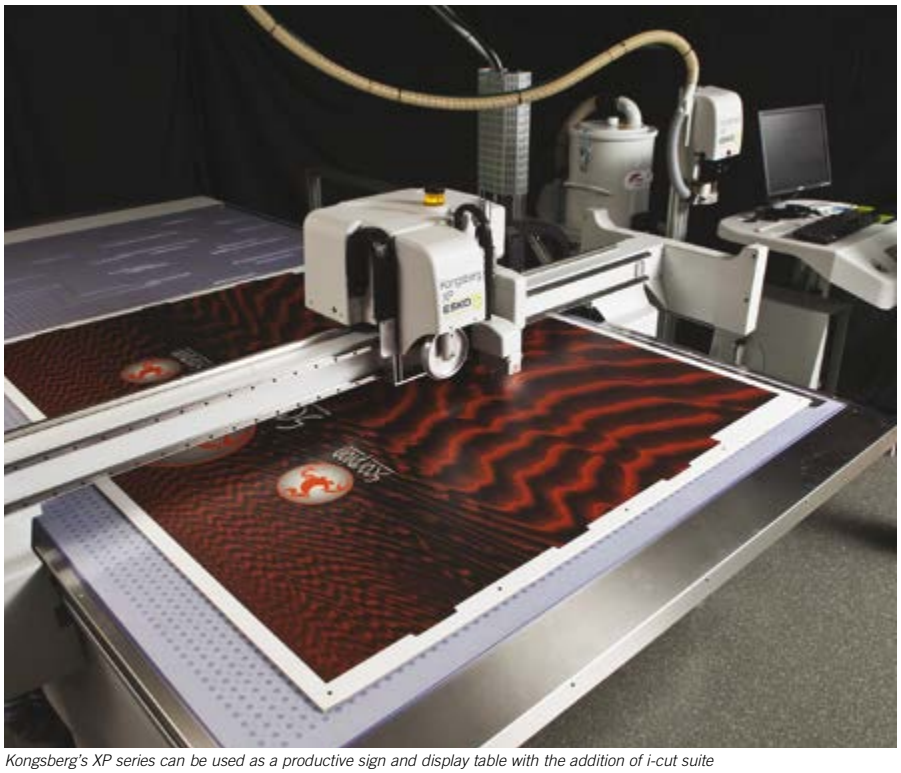
Today, in wide-format digital print, the use of this computer-driven equipment serves two purposes. First, these machines are used for the contour cutting of applications to introduce and apply finished curves and angles to printed output and, second, this equipment's accuracy makes it a valuable substrate optimisation tool when outputting nested and step-and-repeat smaller jobs.

The more sophisticated cutting tables are able to produce additionally refined output, including a creasing option to simplify the folding of finished applications. These systems are used typically in packaging and point-of-purchase jobs where accurate folding facilitates the construction of three-dimensional requirements.

Similarly, these machines can handle kiss-cutting, where a self-adhesive material is cut without touching the carrier sheet, as well as perf-cutting where it is essential for the cutting tool to work cleanly through all layers of media leaving a clean and accurate outline. The intricacy of these functions is complemented by a unit's ability to work with thick light-weight and heavy duty substrates as well as the finest of flexible options, including fabrics.

Although several manufacturers specialise in the manufacture of cutting tables suitable for working with heavyweight substrates and lightweight films, their pedigrees vary enormously. Some machines have emerged from industrial routing histories whilst others have been developed from earlier pen plotting and CAD techniques to become the sophisticated tools they are today.

Kongsberg's background has been associated with precision results since it started manufacturing drafting equipment more than 45 years ago. Today Kongsberg systems are familiar to all those whose require heavy-duty, precision cutting tables and, as a result, the company's production volume has increased more than ten-fold during the past two decades.



Kongsberg's XP series can be used as a productive sign and display table with the addition of i-cut suite

Nested images on the Kongsberg i-XE10

HISTORY

Kongsberg, based in the town of the same name, is located in the area of Norway long acknowledged as being the technical centre of the country. This region's reputation manifested itself following a history of silver mining and Kongsberg is still the home of the Royal Norwegian Mint as well as an arms factory. Known for its emphasis on technology, it is here that defence, aerospace, off-shore, maritime, automotive, oil and aerospace industries converge.

The Kongsberg company was established for the design and manufacture of mapping systems in 1969, extending its expertise in the pre-press area for printing nautical and topical maps, plus the specialist plotting techniques required for the engraving of clichés for flexo and gravure printing. Entering the markets for part and scale drawings for the automotive and aircraft industries the following year, this was followed by its transition to the packaging sector in the 1980s.

This latter move was the direct result of an enquiry from SCA at a trade show. In 1984 this important packaging company was looking for a prototyping cutting table and this led to a dramatic sea change; by the end of the decade, Kongsberg had made the strategic decision to focus completely on packaging, developing and manufacturing machines specifically for this market, drawing on the expertise formerly incorporated into its high precision modified drafting tables.

THE GRAPHIC CONNECTION

The original Kongsberg company was originally part of the area's arms factory, set up in 1814, and was government owned until 1987. Having commenced by manufacturing drafting tables for shipping yards and plotting systems for verifying media for flame cutters prior to cutting, production of CAM tables started during the mid-1960s.

Barco Graphics, who acquired the Kongsberg company in 1998, merged with Purup-Eskofot in 2001 and, five years later, the combined enterprises became known as Esko. The following year, in 2007, Esko joined forces with Artwork Systems Group, formerly its main competitor in the packaging pre-press sector, and EskoArtwork was established as single entity. This enabled the augmentation of its pre-press and packaging software expertise and the addition of a practical cutting solution to its front-end options whilst retaining RIP independence. As a result, users of different print devices could, for the first time, integrate additional solutions and powerful finishing capabilities to their workflow operations and incorporate value added cutting options to their applications.

Today's Kongsberg tables reflect the company's history in precision drawing, plotting and cutting, and Boeing still uses its earlier systems for producing part and scale drawings, plus paint masks for aircraft. Remaining at its manufacturing facility within the Technology Park in Kongsberg, a second production plant was opened in Brno in the Czech Republic in March 2008 which it outgrew quickly, necessitating a move to larger premises.

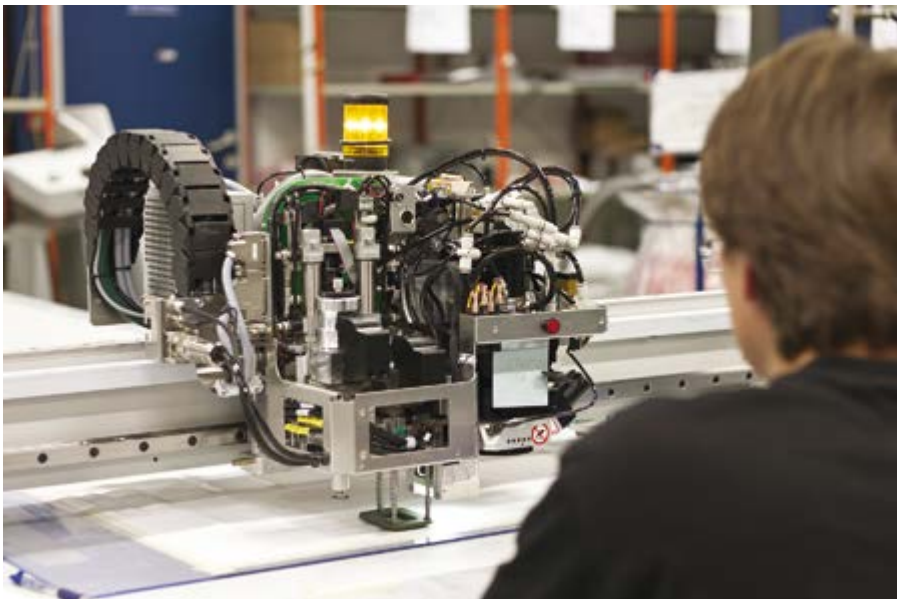
Reflecting its overall expansion plans during the years, currently the primary Kongsberg facility in Norway employs 85 people. The manufacturing subsidiary in Brno has 45 members of staff. Since 2007, the company's original floor space of 3,000m^2 has more than doubled to 7,700m^2 and this is a reflection on the need to expand its production volume which has increased ten times during the past two decades.

KONGSBERG TODAY

The company now delivers total finishing solutions for a diverse range of markets, including those which encompass EskoArtwork's pre-press systems. Thus, although the majority of machines are used for a variety of environments relating to packaging, sampling and displays, their capabilities also make them suitable for the continued production of clichés for the flexo market.

Continued over

Production at Kongsberg's factory



Precision manufacture is a vital element in all Kongsberg tables

Since the advent of wide-format digital print another important market has emerged which has seen Kongsberg tables grow in popularity as finishing solutions for sign and display requirements. The company started to concentrate on this sector five years ago; the timing coincided neatly with the upsurge in the use of flat-bed UV-curable printing machines and need for users to mill, route and blade-cut the many materials being used in wide-format digital applications. Production houses found that very powerful, fast machines were essential when working with heavy-weight substrates and all Kongsberg needed to do was to develop some specialist tools for its primary products, designed for the materials within this sector, to bring its products in-line with demand.

Complementing Kongsberg's cutting capabilities, EskoArtwork's i-cut Vision software was originally developed for cutting screen-printed self-adhesive vinyl. Thus, it was logical to progress these capabilities so that the principles were extended to digitally printed rigid and flexible materials. This camera system provided the ability to read multiple registration marks and use other specialist algorithms, such as correcting skew and distortion in the media. The i¬-XE , i-XL and i-XP in the Kongsberg model names denote the inclusion of the i-cut vision system as part of the table's configuration.

Subsequently, EskoArtwork released its innovative i-cut Suite of software tools which is based on its established Enfocus technology. This modular solution provides all the pre-flighting and auto-correction likely ever to be needed in PDF workflow. The algorithms form a cohesive part of the overall i-cut functionality and this also incorporates a layout function for optimising material usage to maximise material coverage, thereby drastically cutting waste, and saving time and money when nesting applications for contour cutting.

THE KONGSBERG MACHINES

The Kongsberg tables come in three main product lines with configuration selections to make them suit the most appropriate types of application stream. The first in the series is the Kongsberg XE, designed to work at high speeds with lighter weight materials, including a version designed to be a sample table for the folding carton industry. This market sector is reliant on precision accuracy for cutting and creasing and, thus, the machine's properties are able to cater for the levels of accuracy demanded within this sector.

A specially modified version of this system is also used in the commercial printing arena for use with small-format digital printing systems, with the i-XE series featuring a sheet feeder and stacker. Supplied with automatic waste removal, this unit has become popular with digital press users who want to run a finishing unit inline with machines such as the Xerox iGen and HP's Indigo.

Kongsberg's XL series is the largest product in terms of volume size, and this was introduced ten years ago. Currently around 2,300 are installed worldwide and, although this model started its life originally as a sample table, building on its basic configuration has now made it a high productivity, sophisticated option. Consequently, there are now seven different versions in variable sizes, with the largest having a processing area of 15m^2.

For sign-makers and display producers, the XL series has been optimised for this sector, with a version specifically tailored for the packaging sector. Although both technologies are based around similar parameters, Kongsberg addresses the first of these markets which needs automatic loading of sheets and rolls for continuous production, a requirement which isn't so essential within the short-run and one-off prototyping arenas.

Finally, the Kongsberg XP series can also be made into a productive sign and display table with the addition of i-cut suite. Around half of the number of machines manufactured thus far are now being used in these environments. This unit is proving to be particularly popular where multi-material displays and corrugated point-of-purchase applications are being generated, with the latest XP Auto providing full digital workflow for on demand production and just-in-time delivery.

To summarise, Kongsberg's history has always been targeted towards instigating precision drafting and cutting systems for specific market requirements, from industrial through to sign and display. The strength and reliability of today's solutions are testimony to the decades of research and development which have resulted in highly sophisticated cutting solutions, and this has been perfected over many generations of machine manufacture. Therefore, when an end user is making the move to a digitally driven die-less cutting table, the manufacturer's history and pedigree should influence strongly the overall considerations and the final purchasing decision. ■

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WATER ALSO HAS BARS

Marcus Geigle explains the role of barcodes in modern product identification

Worldwide piracy resulted in losses of €184 billion according to the Organisation for Economic Cooperation and Development (OECD). More worryingly this represented a 53 percent increase in two years.

The endemic problem of counterfeiting touches almost every business sector, from globally renowned premium brands in consumer markets to capital goods. Even medicines and pharmaceutical products do not escape; a report by the Centre for Medicines in the Public Interest predicts revenues from counterfeit medicines hitting $75 billion worldwide in 2010, a rise of more than 90 percent in comparison with 2005.

As a result the FDA (Food and Drug Administration) has stipulated a requirement for a comprehensive labelling obligation for pharmaceutical packaging via an electronic pedigree, designated the e-Pedigree. There are also plans for the labelling of individual packages to become standard next year according to the European Federation of Pharmaceutical Industries and Associations (EFPIA).

Packaging has also become a vital way to tackle the 'grey market problem', where a copycat approach takes place inside groups that produce globally. This involves using the right procedures and applying test codes that cannot be counterfeited or identified quickly as counterfeits. The latest developments even make it possible to use the packaging material itself as a test criterion, such as DNA testing, where scanning the surface roughness of material can identify unequivocally whether the packaging is produced by the brand manufacturer or not. The most effective test procedures are based on optical systems. The test characteristics are captured and compared with background reference templates.

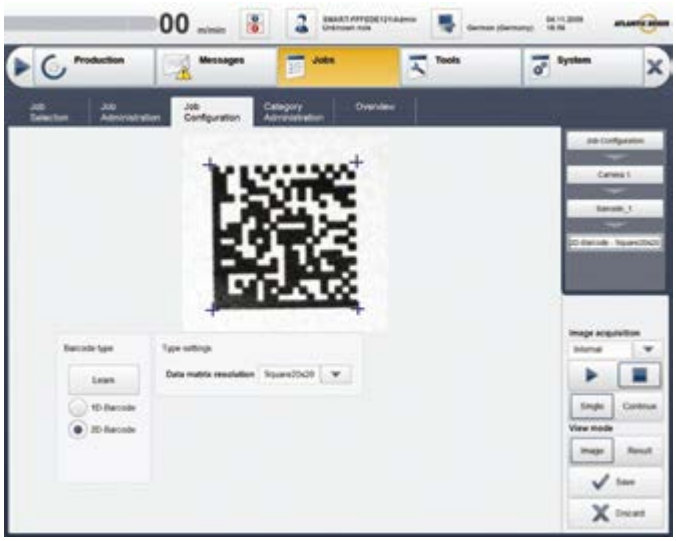
Industrial digital printing is particularly cost effective

ARRAY OF OPTIONS

Key areas of labelling options in anti-counterfeiting are direct packaging printing and the use of printed labels or functional RFID labels. Imprinted test characteristics, such as encrypted datamatrix codes, represent the least expensive variants; the pharmaceutical sector uses general valid standards based on the stipulations of GS1 (Global Standards 1) for its specially created datamatrix code. And these guarantee adequate security. Printing is done using integrated ink-jet printers that can readily handle the variability and constant changeability of print data. Printing with invisible inks is playing an even bigger role, too.

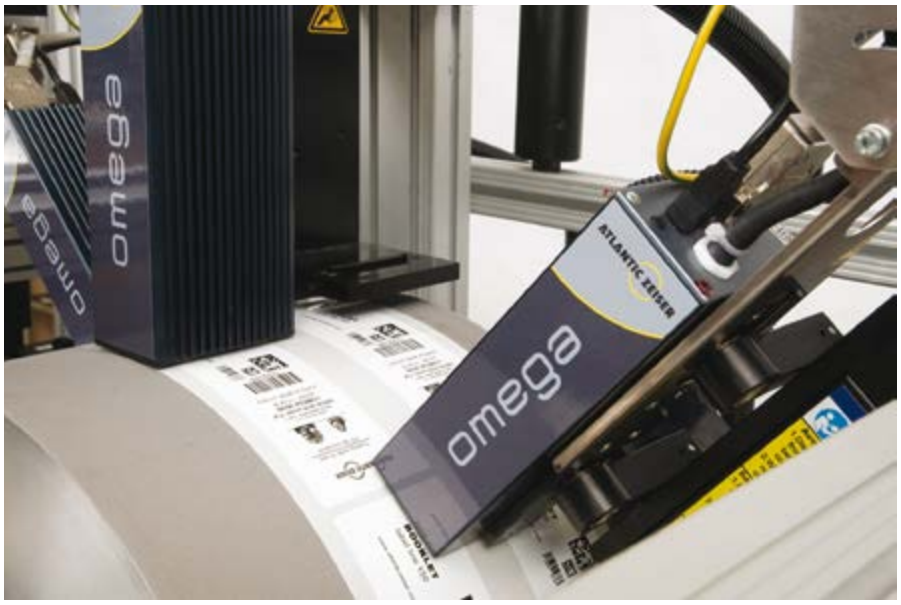
Particularly cost effective, though, is industrial digital printing contributing to product identification. This is cost-efficient as the barcode itself and widely used as a means of identification.

When the first barcodes were tested on products in 1968 in selected branches of the Swiss Migros supermarket chain, it was by no means certain that machine-readable codes in bar form would be used globally for the identification of every product. The barcode



2D barcodes are instrumental in targeting counterfeiting

Digital printing is the de facto choice for personalised data or variable content



Integrated ink-jet printers can readily handle the variability and constant changeability of print data.

was developed to help identify the origin and life of a product. These inconspicuous black bars, with combined series of numbers, have globally revolutionised the entire sector of goods logistics, up to point-of-sale. As consumers, we perceive when a product barcode is read by an infrared scanner acoustically via a beep at the cash register. What the consumer might not be aware of is the continuing development and innovative technological research taking place for cost-efficient production identification.

WHEN IS DIGITAL PRINTING WORTHWHILE

Digital printing is also the number one choice when print assignments are requested with personalised data or variable content such as numbers or barcodes and the assignment has a very short deadline for delivery. Manufacturer Atlantic Zeiser has years of experience in modern digital printing methods with particular expertise in personalised narrow-format printing processes for packaging, labels and plastic cards. In addition to providing complete solutions from a single source, including infeed, printing unit, ink supply, dryer, sensors, camera control, monitor and transport system, the company also offers ink-jet printing modules at various performance levels for integration into existing systems. The benefit for the customer in this respect is that any previous investments can be improved, upgraded and expanded. Furthermore, they can continue to use their existing transport systems.

Laser, thermal transfer and ink-jet printing are amongst the most common digital printing techniques in the fields of product identification, labelling and packaging. However, laser and thermal transfer printing both demonstrate system-related drawbacks in these fields. With laser printing, the disadvantages lie in its complex safety requirements, the necessary extraction and poor or blurred print contrast. The disadvantages of thermal transfer printing include the life-cycle costs and the limits in terms of adherence to challenging substrates. For these reasons, it is becoming more and more evident that the contactless ink-jet printing process is the one with the brightest future. This method encompasses both continuous ink-jet printing, which involves electrostatic deflection of a continuous stream of droplets onto the print substrate, and drop-on-demand technology (DoD), whereby ink droplets are only generated on demand.

Binary drop-on-demand print-heads spray fixed-size droplets of just a few picolitres. The droplet size is always the same and jetting is based on a clear yes or no decision in terms of print or not print, hence the term binary print head. These heads are capable of applying fine fonts, sharp text with crisp edge definition, clear lines and encoding on the smallest of areas. They are recommended for the digital printing of barcodes and numbering.

VERSATILE UV

UV-curable inks are currently one of the most versatile commodities; this is the only formulation capable of durable adhesion to non-absorbent materials, such as plastic, metal, plasticised surfaces and glass, as well as to paper and cardboard. Drop-on-demand print-heads are ideal for use with UV-curable inks because the nozzles cannot dry up and the inks will not harden into solid plastic until they are exposed to UV light. In addition to excellent adhesion and scratch resistance, UV-curable inks also offer a high degree of lightfastness; their printing systems are very stable and more resilient compared to solvent-based ink-jet printing systems.

For the curing process, Atlantic Zeiser uses environmentally-friendly LED UV systems such as the Smartcure range which produce no ozone, unlike traditional UV lamps. LED UV systems require only one tenth of the usual amount of energy and offer a significantly longer service life.

TRACK AND TRACE

Then there is the company's Track & Trace module that empowers brand owners by enabling them to counter the burgeoning counterfeiting threat and protect their brand reputation and revenue. Track & Trace integrates easily into a new or existing print packaging production line. Users can include all standard product tracking codes on the packaging. The codes include GS1, all types of numeric codes, and 1D and 2D barcodes, which are used to check the legitimacy of the packaging and product online.

Track & Trace also includes an optical checking system. In just one fast step cameras automatically read and verify the selected layout and check the digits. Overall, the solution affords users maximum flexibility when it comes to late-stage customisation. If the check code does not match the reference data, the module rejects the packaging following the check. The assigned Track & Trace code can then be added to the packaging in a subsequent print run.

Ralf Hipp, Vice President Digital Printing and Coding Solutions Atlantic Zeiser, comments: "Track & Trace hands the power back to manufacturers and brand owners. Its seamless product tracking enables them to strike a meaningful blow against counter-feiters. And, crucially, Track & Trace is highly automated and cost effective – it slots effortlessly into an existing packaging production set-up and isn't a drain on resources or revenue."

SUMMARY

Machine product identification can no longer be overlooked in production or goods' logistics. Cost efficiencies have to be considered in any production cycle. Industrial digital printing with its ink-jet print solutions is specifically intended for inexpensive, high-quality production of barcodes, markings, numberings and serialisations; in contrast, water is the byword for bars, even if this is only in the form of a barcode on a bottle. ■

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GROWING TEXTILE PRODUCTION IN THE VISUAL COMMUNICATION INDUSTRY

Roland Biemans assesses the quality requirements and the possibilities for brand owners, marketeers and print service providers in digital textile application

Today's visual communication industry is rapidly changing. New print-head technology, ink formulations and fabrics are paving the way to benefit seriously from the improved quality in digital textile printing. However, the catching up by brand owners, marketeers and print service providers seems to stall because of unclear standards, dubious marketing figures and the drive to over-simplify textile requirements. Every so often, a strong reminder is essential in order to get the right message across.

Much has been said and written about digital textile printing. Yet there still is a big question mark when it comes to general understanding about what textile printing actually encompasses and where the benefits lie. The traditional textile print production industry as well as the visual communications arena are looking for methods to enable digital work-flows in textile printing. Both meet challenges when trying to implement digital direct to textile printing. Even though great progress in understanding has been made over the last few years, there is still a huge gap between what's expected and what's possible.

Lightweight digitally printed material can easily be mounted as back-drops


Promotional dresses add to the marketing mix with single pieces and one-offs printed digitally

With more companies focusing on digital textile printing, there is a very positive side thanks to the availability of new products, services and opportunities. The downside is the often-heard complaints from newcomers in the textile printing industry about insufficient proper advice and lack of expertise. This criticism applies to manufacturers and suppliers, as well as to print service providers. As a result, many end-users are not provided with solutions they are looking for; worse, they are being supplied with inferior products.

PRODUCTION REQUIREMENTS

First of all, the 'textile market' comprises many different applications and requirements. The intended use of the fabric is the most important starting point to identify exactly what's needed to produce a specific end-product. A 'textile' product may vary from natural yarns for garments, through to synthetic fibres for flags and banners. A 'textile product' can be a wall mounted banner, a stand-alone pop-up banner, a beach flag, country flag or company flag. It can be a carpet, back-lit frame, curtain, room divider, building wrap, bed cover, a garment and much more.

The predominant textile media used in visual communication is a polyester based fabric. In the USA, nylon is often used for flags. In northern Europe, polyspun material has been the choice of fabric for traditional flag printing. In today's market, a woven or

Digitally printed fence fabric was used for the Vancouver winter Olympics

knitted polyester is the de facto standard. This differs from the predominant coated vinyl or pvc media used in the sign industry.

The production process needs to fit requirements for the type of ink: high energy sublimation (also known as disperse direct), low energy sublimation (dye-sub), acid, reactive and pigment. In turn, the type of ink chemistry needs to fit requirements for the media (such as polyester, nylon, cotton, silk). Based on the media and ink combination, the choice comes for infra-red fixation, heat-press sublimation or steaming. The structure of the fabric also needs attention, for example whether it is woven, non-woven or knitted. Every choice has its pros and cons.

Polyester fabric is printed mostly with dye-sub or disperse direct ink, although UV-curable and solvent-based inks (including HP's latex formulation) can also be used. The great benefit of sublimation ink is the fact that the colorants will bond with the fibre during sublimation or fixation. The colours are 'inside' the media and don't stay within the coating and on top of the media, as it the case with UV-curable formulations. Even latex inks on porous textiles can suffer from abrasion or 'rub-off'.

Low energy sublimation ink is easier to print with, but has the disadvantage of colours fading faster; its UV resistance, or light-fastness, is less resistant than equivalents using high energy disperse direct ink. Dye-sub can also suffer from a 'halo' effect which results in less sharp images. The disperse direct ink is a 'stronger' ink than the dye-sub kind, and this is very important for outdoor use, such as for fence fabric, flags and banners; artwork will last longer.

Another benefit of aqueous-based sublimation ink is the absence of hazardous components as found in UV-curable, solvent-based and, even, in latex inks. When executed properly, direct-to-media printing with disperse ink is achievable on uncoated fabrics and offers maximum print-through; this is essential in applications viewed from both sides, such as with flag printing. As such, products can be sold at a higher margin, with a 'green' label and with a higher quality. Other media and ink combinations cannot allow this.

The biggest advantage of direct-to-media is drastically reduced waste. This method doesn't need printing on transfer paper first before calendering (or heat-pressing) it onto the media. Waste is both an economical and an ecological factor in print production. Print speed doesn't account for much if a large portion is being thrown away as waste due to incompatibility of media, ink, treatment or lack of know-how.

The qualities of the printed end product should fit the needs of the application. Longevity, fastness and hand properties are important. Post-processing is something to think about: is the printed material easily confectioned, applied or handled. Should it be washed or does it need a finish (such as being made fire retardant or water repellent). A washed textile no longer has coating or ink residues and will, therefore, have a better feel. Moreover, it will be less prone to stains and it will last longer.

ECONOMICS

As well as material concerns and application issues, economics come into play. Where the traditional textile print industry is accustomed to mass production with long-runs, the digital inkjet business mostly produces short-run non-textile products. This approach to digital textile printing is very different, and so is the expectation. Where sign-makers are familiar with a single process system, traditional textile printing is accustomed to several production steps. In the balance of the economics behind production needs, it is important to understand the entire production flow. An example lies with the choice of fixation equipment and the subsequent implication of energy and resource cost; for example, a steamer needs water and energy, and a calender needs to heat up and uses lots of energy plus considerable amounts of paper.

Additionally, the impact on business by legislation and requests from customers with regard to environmentally friendly products are increasingly becoming a factor.

Continued over

Using high energy disperse direct inks, colours will last longer with print through and sharpness both guaranteed

Opaque deep blacks and crisp high resolution images are suitable for indoor retail imagery

RAISING AWARENESS

How does this all reflect on the awareness of possibilities for brand owners, marketeers and print service providers?

Stated simply, by controlling processes and understanding the requirements and economics, it is possible to produce innovative textile alternatives to conventional printed products with higher quality, higher margins and higher up-time. Based on sound advice and expertise, using bespoke equipment specifically built for the purpose of digital textile printing, it's easier to focus on customer demand, instead of losing time on working around the problems imposed by suppliers.

Industry survey figures show growth in textile printing of 25 to 30%. Printers increasingly are exploring new ways of making use of fabrics to replace their traditional printed output. Manufacturers are developing technologies and equipment for textile printing. End-users are starting to understand the benefits of using textiles, such as easy mounting and installation, simpler logistics such as light-weight transport, and more eco-friendly production, to name just a few of the advantages. There's a market for sampling or proofing, a market for outdoor advertising, a market for in-store and in-house decoration, plus endless opportunities for exhibition design and dedicated applications for automotive and clothing. It is no wonder that so many wish to enter this industry.

Yet, all too often, a manufacturer that solely focuses on converting an existing printer into something that can also print on textile, 'forgets' to take all the aforementioned considerations into account. And, just as frequently, a standard is set – not because of possibilities, but from the limitations, leaving the marketeer, the brand owner, the designer and the print company with a misunderstanding of the practical possibilities.

It's not an easy task to filter the marketing stories from the realistic production figures. There is no global forum or online portal with product reviews and comparison sheets. Well-known manufacturers might not have the right product but produce convincing marketing 'spin', while lesser known manufacturers could have the perfect product but do not have the right exposure.

To counter this trend, Hollanders Printing Systems, together with media manufacturers, technology partners and industry organisations, has come up with an initiative that should serve to change the situation for the better. Instead of focusing on sales of equipment only, this initiative concentrates on putting together the pieces of the puzzle, to raise awareness of all textile application opportunities and to research, educate and demonstrate in its Digital Textile Print Competence Centre. The overall goal is to prove the benefits of these advanced technologies and combine these with practical application examples which will appeal to brand owners, marketeers and print service providers. ■

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Expo design can benefit from appealing, light weight decoration constructions using fabrics

SUBSTANCES REQUIRING AUTHORISATION AND CANDIDATE SUBSTANCES FOR AUTHORISATION

Elaine Campling investigates further authorisations pertinent to REACH regulations

The first substances requiring authorisation for use according to the REACH Regulation have been confirmed with the publication of Commission Regulation (EU) No 143/2011, amending Annex XIV of REACH. The regulation formally adds six substances to the Authorisation list with 'sunset' dates between 2014 and 2015. This sunset date is the date after which a substance will not be permitted for use or allowed on the market without an Authorisation, unless a specific exemption applies. Applications for authorisation should be made 18 months prior to the sunset date and will be granted to successful applicants for a specified time period, subject to review.

When applying for authorisation, applicants must submit a chemical safety report identifying the risks from using the substance and an analysis of possible alternative substances. The analysis should identify whether the replacement substance will reduce the overall risk and the technical/economic feasibility for use. If a suitable alternative substance is feasible, the organisation must submit a substitution plan.

Member State Competent Authorities or the European Chemical Agency (ECHA) may propose a substance for inclusion in the Candidate List of substances for authorisation, so called substances of very high concern (SVHC), on the basis of criteria set out in Article 57 of the REACH Regulation, substances classified or categorised as:

- Carcinogenic, Mutagenic or Toxic to Reproduction (CMR) classified in category 1 or 2,
- Persistent, Bioaccumulative and Toxic (PBT) or very Persistent and very Bioaccumulative (vPvB), and/or
- Otherwise identified as posing possible serious effects to human health or environment, on the basis of scientific evidence, and which pose an equivalent level of concern to the above.

The substances now included in Annex XIV, subject to authorisation of use are three phthalates classified as toxic for reproduction, 4,4'-Diaminodiphenylmethane (MDA) classified as a category 1B carcinogen, Musk xylene (vPvB) and Hexabromocyclododecane (HBCDD) with a PBT classification.

NEW GUIDANCE DOCUMENTATION

ECHA has published two new guidance documents in relation to the authorisation process, the first of which deals with the application procedure, including analysis of alternatives and substitution plan. This guidance also identifies how third parties may prepare and submit information on possible replacement substances during the public consultation, which is initiated following a submission for authorisation. The second of the guidance documents covers the preparation of socio-economic analysis relating to the continued use of the substance. Socio-economic analysis may be submitted when applying for authorisation, but is required when adequate control of the risk of using the substance cannot be demonstrated and no suitable alternative exists. Organisations will likely require access to a range of experts in submitting the analysis; the guidance document is quite lengthy, indicating the level of complexity.

http://echa.europa.eu/reach/authorisation_under_reach_en.asp

ECHA is required by the REACH Regulation to recommend priority substances to be included in Annex XIV, at least every second year. In December 2010, ECHA made a recommendation to add a further eight substances to Annex XIV, ie for authorisation of use. It remains to be seen how quickly the list

of substances requiring authorisation will grow, along with the number of applications for authorisation, since authorisation may prove too costly for many organisations. Notwithstanding reduced fees for micro, small and medium enterprises, the base fee for authorisation (per substance, per use) is €50,000.

Further fees will be payable for an additional use (+€10,000) or an additional substance (+€10,000), noting that the inclusion of any additional substance in the application must be from within the same group, defined by Section 1(5) of Annex XI to REACH. REACH fees and charges, including those for authorisation, are set out in Commission Regulation (EC) No 340/2008.

Authorisation of use may be applied for by a group, with additional charges per applicant. However, since ECHA will issue only a single invoice to the main applicant and not individual parties, the group must divide the fees amongst themselves, according to the structure of the fees regulation. Members of the group must therefore 'settle up' with the main applicant, highlighting another facet of the REACH regulation, ie participation amongst organisations that may be competitors in the market-place. It is worth noting that downstream users are permitted to apply for an authorisation. Downstream users may also use a substance that has been authorised further up the supply chain, providing that the authorisation requirements are complied with and notification is provided to ECHA.

ECHA also added a further eight substances to the Candidate List in December, sparking off a further wave of communication regarding the presence of SVHC in products. It is expected that the Candidate List of substances for authorisation will expand at an increased rate, since more information on substances is now available, following the passing of the first REACH registration deadline.

HARMONISED CLASSIFICATION AND CLP NOTIFICATION

ECHA's committee for risk assessment (RAC) is responsible for preparing the opinion of the agency in the evaluation of substances, applications for authorisation and proposals for restriction of use of substances. The Committee is also responsible for preparing opinion on proposals for community harmonised classification of substances. A proposal for a harmonised classification may be initiated by Member State Competent Authorities, manufactures, importers and downstream users for CMR substances, respiratory sensitisers and active substances in biocidal and plant protection products.

Proposals for a harmonised classification may also be submitted in instances when suppliers have classified identical substances differently from one another. Once a proposal for a harmonised classification is satisfactorily submitted, ECHA will initiate a 45 day public consultation. Taking into consideration the comments received from the consultation, ECHA's RAC will issue an opinion, which is then passed to the European Commission for decision. If the harmonised classification is accepted, the substance will be included in Annex VI, Part 3 of the CLP Regulation and manufacturers, importers and downstream users will be bound by the documented classification and labelling of the substance.

From practical experience, ESMA member companies participating in CLP notification (see previous editions of Specialist Printing Worldwide) noted that in many instances several classifications were submitted for seemingly identical substances. However, companies are obliged to agree a common classification, which should therefore invoke communication between notifying organisations going forward.

ECHA report that in excess of three million classification and labelling notifications were received by the 3 January deadline, for approximately 25,000 substances. The largest number was from Germany (800,000), followed by the UK submitting 500,000 notifications. The Classification and Labelling Inventory will be available some time during 2011.

Thus, further REACH and CLP milestones have passed. A challenge going forward, particularly for downstream users, such as printing ink manufacturers, is coping with the management of extensive information in the form of exposure scenarios (ES). Typical printing ink formulations contain many ingredients. A big challenge will be trying to make sense of the large number of ES received for individual substances and deciding how to pass the information onto their customers in a manageable and meaningful way, notwithstanding internal risk management measures that will need to be reviewed. This is a complex topic and probably best saved for discussion until another time.

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ESMA
Driving Print Excellence

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A SOLID HISTORY IN PAD PRINTING

More than a quarter of century's developments are outlined by Karen Krulikowski

Pad Print Machinery was founded in 1985 with the goal of being number one in customer service and satisfaction. In the quest for that goal, the company says it is driven to become partners with its customers to create machines that satisfy their requirements 100%. The performance toward this goal has enabled dramatic growth.

Julian Joffe is the founder and CEO of Pad Print Machinery of Vermont. Although Joffe earned his degree in zoology, he had had a penchant for manufacturing as a result of the many hours he spent tinkering with automation in his father's workshop.

Joffe began working at his father's textile machinery business and took over leadership of the company – expanding the business to include pad printing. He became interested in this process after recognising its limitless potential and innovative applications. Joffe and his family moved to the USA in the mid-eighties. In 1985, he struck an alliance and became the exclusive North American distributor of Comec brand pad printers, settling in Yonkers, NY in a pre-World War I building with a staff of four.

During the next ten years business flourished. However, Joffe began to feel the draw to New England living. In 1995, he could no longer resist the urge to live a simpler, more enriched lifestyle and moved to Vermont. It was then that Pad Print Machinery of Vermont was born in what had been, during the fifties and sixties, the sole movie theatre in picturesque Manchester, VT.

As the company continued to grow both in number of employees and the amounts of machines being built at any given time, it began to suffer a terminal case of claustrophobia. In 2003, a move was made to a new airy and spacious facility, just five minutes north from the cramped quarters in the old theatre.

A typical tagless print

Also developing and growing were the types of products and services that PPMOV offered. New innovations in mechanical engineering and electronics featured CNC equipped and servo-driven pad printers, which are extremely fast, precise and reliable.

TAGLESS PRINTING DEVELOPMENTS

PPMOV was at the forefront of developing tagless printing more than eight years ago, working with numerous apparel manufacturers of T-shirts, underwear and lingerie to identify brands, sizes, and care labels by printing directly on the fabric. The company also worked with these manufacturers to develop turn-key solutions including operator and technical training, plate-making, custom pads and graphic support and has multiple operations in Asia, Central and South America, Philippines and the USA.

In addition to its growing product line, PPMOV has continued to increase its production and engineering staff. "This expansion brings our engineering and machine assembly team to a full one-third of our staff," states Joffe. "One of our major areas of expertise is customising automation systems for our clients, and we have been fortunate to find the quality of engineering talent we required to fulfil our needs, along with our existing capabilities.

"We now have a greater representation in the areas of CAD modelling and design, automation fixture design, new machine conceptualisation and execution, automation process control engineering, and Microsoft systems' software programming," Joffe continues. "This broadening of engineering expertise allows us to respond quickly to our customers' needs and to be flexible to changing market dynamics. Especially with US-based companies re-sourcing back home, efficiency through automation is the name of the game."

Joffe adds: "Included in the company's growth is the sales engineering team who assist customers with existing operations, advising in the development of new systems to improve efficiency and cost savings in their operations."

THE COMPANY TODAY

Today PPMOV offers a full line of pad printing equipment-from table-top models to sophisticated fully automated printers, plus a full complement of accessories and consumable supplies. Included are devices for conveying, feeding, loading/unloading, inline pre-treatment, rotary automation, and post-curing. The company also designs and builds specialised machines to fit whatever unique application a customer may dream up.

Additionally ink, graphics, pad and plate departments work in tandem with PPMOV's engineering design and manufacturing teams to provide the right consumables for unique printing challenges. There is also a full technical support group who can train operators at the company's Vermont facility or at the customers' site, troubleshoot issues and assist with machine set-up on-site.

PPMOV regularly partners with medical device manufacturers to research and develop new techniques for printing on difficult-to-

Pad Print Machinery of Vermont's premises

The XD070 single-pass greyscale industrial ink-jet printer for high volume jobs

The versatile KP08, shown in a three-colour configuration

The XE Tech 16-20 is a fully automatic and computerised pad printing centre

mark products. For example, its 360 degree catheter printing machine with auto-feeder is claimed to be unmatched by the competition, as is the company's 13-colour catheter banding machine. These machines are currently printing on a wide variety of plastics, metal, ceramic and glass items including rapid-test diagnostic devices, ostomy supplies, OTC pharmaceuticals, catheters, syringes, diabetes testing equipment and more.

In 2005, Pad Print Machinery of Vermont entered the ink-jet technology market with its first offering of a single-colour system purchased from a manufacturer in the United States. After promises of a bright future and offerings coming soon, in early 2006, the six-colour machine never materialised and the company being used went out of business.

This was a hard blow and a big disappointment to the company and its customers, but it picked itself up and made the decision not to be placed in this situation again. Thus began the PPMOV Ink Jet Division and, with a small team of dedicated professionals, it started designing its own monochrome ink-jet systems built locally in the USA.

Throughout, PPMOV has used the knowledge it has gained over time. The monochrome ink management system and experience with system integration was used to create a revolutionary new system that has components field-tested during a period of years.

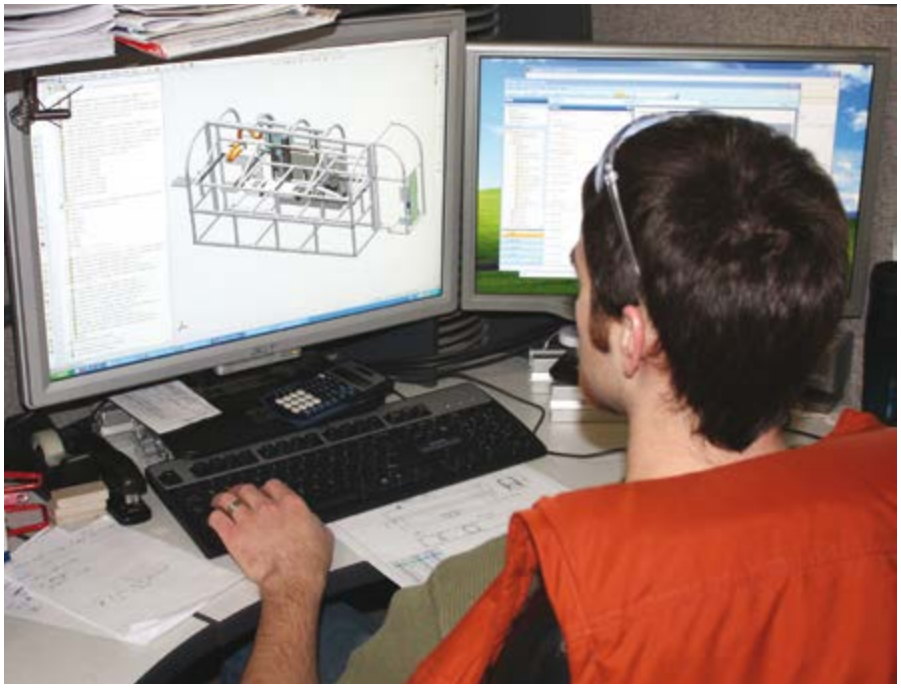
MOVING INTO INDUSTRIAL INK-JET

Fast forward to 2010 and, at the SGIA show in October, PPMOV unveiled an eight-colour industrial digital ink-jet printer, the XD070. This is capable of fine lines and details in a single pass at 406.4 mm (16 inches) per second/360 dpi, ideally suited for multi-colour printing on flat and semi-flat surfaces.

The company's engineering team and software developers designed this new ink-jet system with the focus of changing jobs on the fly. Using UV inks that cure within seconds, this new multi-colour ink jet is fully programmable and customisable for in-line applications. With no pads, clichés or screens to change, and the capability to pre-program print jobs, the printing process has virtually no down-time. In this ultra-competitive world economy, high volume and cost-efficient manufacturing isn't just a goal; it's mandatory.

PPMOV continues to grow with new product offerings and has led the pad printing industry with breakthrough innovations such as the ability to print on medical devices as small as 0.1016 mm (.004 inch) with its eight-colour industrial digital ink-jet printer where opportunities are just beginning.

Currently, the Pad Print Machinery of Vermont's team includes 43 highly skilled and motivated individuals plus full engineering, software development and tech support teams. In pursuing its goal of number one in customer service and satisfaction, the company is constantly pushing the envelope, discovering more and more ways seamlessly to incorporate pad and ink-jet printing into the customer manufacturing process. ■



Sophisticated design and engineering expertise is essential for quick customer response

Karen Krulikowski works in Marketing and Sales at Pad Print Machinery of Vermont

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FESPA AMERICAS IS LATEST EXHIBITION SUCCESS

Positive feedback comes out of Orlando

The first ever FESPA Americas show, held alongside Graphics of the Americas and the ISS show from 24 to 26 February in Orlando, Florida, has been hailed a success with overall visitor numbers 16% higher than the previous Graphics of the Americas exhibition in 2010. Representing 90 different countries, 75% of visitors to the show were senior decision-makers within their companies.

FESPA Americas aimed to educate and inspire visitors through a range of innovative exhibits and show features. This approach drew positive feedback from exhibitors overall commenting: "FESPA Americas has brought new life to the GOA show and we have seen a great number of visitors from both North America and Latin America, which is really unique for an event in the US."

Supported by David Murphy, Director of Marketing Americas, HP, who praised the event "We're really pleased with what we have seen here at FESPA Americas – it is a really busy and successful show. You can feel a new level of energy and dynamic exchange of ideas among attendees."

FESPA Americas provided visitors with the chance to see some of the latest and most pioneering technologies introduced to the market, including Sun Innovations' NEO UV-LED-Evolution, a printer which promises new opportunities for producing full colour designs on diverse surfaces including water. Remarking on the company's experience, Lina Safronova, International Sales Manager at the Sun Innovations Company says: "We gained a lot of traffic to our booth with people wanting to see the capabilities of our printer and were running samples constantly to demonstrate photo-printing on any substrate, including water – that was a real show stopper! We sold both our machines at the show and have more quality leads to follow-up."

FESPA Americas offered a packed visitor program, designed to appeal to a broad spectrum of the industry- screen, fabric and digital printers. Attractions included the Wide Format Print Shop Live!, a world-first from FESPA bringing together global brands EFI, HP, Roland, Caldera and EskoArtwork to run functioning, end-to-end print production lines on the show-floor. The event was moderated by Specialist Printing Worldwide's Editorial Consultant, Sophie Matthews-Paul, and there's a detailed account in Sophie Says on page 12.

Platinum sponsor EFI's Frank Tueckmantel, Vice President of Corporate Marketing commented "FESPA is an important partner for EFI on a global basis; they are interested in continually bringing new solutions to facilitate customer engagement in all their events and the Wide Format Print Shop Live! is a perfect example of that."

The Screen Masters Workshop was a boot-camp for aspiring screen-printers

The show also introduced the Screen Masters' Workshop, a unique boot-camp for aspiring screen-printers. Screen masters Michel Caza, Scott Fresener, Charlie Taublieb, Bhargav Mistry and Ad Versteeg offered workshop participants a hands-on learning experience of the complete screen process.

"We were privileged to share our experience with the students at FESPA Americas, and between the five of us there is a lot of it, nearly 200 years in fact!" says Scott Fresener, Screen Master and SGIA Parmele Award winner. "This was a brand new feature format for FESPA shows and I would hope it's one which will return because the feedback from participants has been tremendous. Combining active learning with interactive discussion is a winning FESPA formula."

Tiffany Rader, Chief Operating Officer, Allusive Butterfly commented on the Screen Masters Workshop: "This event has been the highlight of my career, gaining hands-on tips and working with world renowned screen print masters like these has been an invaluable experience that I can transfer to my day-to-day business."

In addition, FESPA Americas saw the second round of the spectacular global FESPA Wrap Cup Masters Series, where vehicle wrapping teams from North, Central and South America competed against each other to decorate a classic Ford Mustang. The winner of the competition was James Miller, Miller Decals from Atlanta, GA, who has now been invited to participate in the grand finale at FESPA 2013 in London.

Commenting on the competition, Miller

Sophie Matthews-Paul (in white) runs a Wide Format Print Shop Live! tour

FESPA Wrap Cup Masters Series

says: "We're so happy to have had the opportunity to compete at such a great event! FESPA provided the format for small business owners like me to globally reach out to the printing community and show the importance of vehicle graphics advertising."

He continues: "The Orlando stage of the Wrap Cup Master Series was an incredible experience. The competition was very well organized and the judges, fantastic. We were ecstatic to win because it was such a close competition, and we were pitched against brilliant installers from all over North America. I was honoured to be competing with such a talented group and even more honoured to be awarded first place. It was a moment in my life that will never be forgotten."

Leading the judging team were Michael Meyer, owner of F+Z Folien Wholesale Company and a wrap expert from Hamburg, Germany, and Rob Ivers, PDAA's (Professional Decal Application Alliance) Certification Director and creator of Pro-Wrap Mags, the first vehicle wrap magnets brought to market. Basing their verdict on numerous criteria including graphic placement and finishing, participants were evaluated solely on the quality of their work, although speed was considered a decisive factor in the event of a draw.

Describing FESPA's intentions in launching the Americas event, Marcus Timson, Sales and Marketing Director at FESPA, says: "With FESPA Americas, we wanted to create an event which brought something completely new to the American market. For us, that meant introducing visitors to the newest, innovative technologies on the market, educating them on the latest market trends, and ensuring everyone got the most out of the event 'experience'- which we started before the show even began with the introduction of our Rock Star Treatment competition."

Visitors who registered to attend FESPA Americas were asked to submit a 100-word answer to the question (What do you think 2011 holds for the wide format marketplace?). From the hundreds of entries received, Robert Parker, owner of Visually Adaptable Graphics, was selected to receive an all-expenses paid VIP trip to the show.

Parker states: "Winning the Rock Star Treatment prize and attending FESPA Americas has been a great opportunity to network with the community, and find innovative ideas and solutions to enhance my business. I would recommend FESPA and their events to anyone seeking expert information on the status and future of trends in the industry. The experience, for me, has been invaluable. Thanks so very much to everyone at FESPA!"

While at the show, Parker had the chance to participate in the Global Business Forum, offering business-critical information, delivered by global experts in their fields. The two-day event included content from Andrew Milne, of bv02, who examined 'Print as an integrated media' and keynote Martin Wragg, Nike, discussing their ethos on sustainability issues.

Australian delegate David Leach, Look Print, says about the forum: "I have gained a lot of useful information. It has been really interesting to see the similarities that are spanning the print industry globally. I have heard some great ideas and solutions, especially on taking print into the modern age and linking it with new technology."

Following the success of the first FESPA Americas, FESPA has confirmed that the show will return next year in Miami, March 1-3.

"FESPA Americas has been a fantastic experience for all of us; the visitors, exhibitors and the FESPA team," concludes Timson. "We were overwhelmed by the response and are glad to know that our innovative show formula has been so well received in Orlando. FESPA came to America in response to feedback telling us there was a gap in the American print market for a new, wide-format event specifically targeting an audience of printers with a pan-regional perspective. We are proud that FESPA Americas has successfully filled that space."

FESPA TV highlights on FESPA Americas at http://bit.ly/fespatv-fespaamericas

See FESPA TV highlights on FESPA Americas at http://bit.ly/fespatv-fespaamericas ■

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SELL-OUT FESPA DIGITAL 2011 SHOWCASES PRINT COMMUNITY'S EVOLUTION

5000 visitors already registered for Europe's largest ever digital wide-format print event

FESPA Digital 2011 is fully sold out, with all 18000m² (net) (36,000m² gross) of available exhibition space allocated to around 370 exhibitors, and a waiting list of would-be exhibitors.

The size and scope of this year's event make it an even more comprehensive showcase of wide-format printing than the three dedicated digital halls at last year's main FESPA exhibition in Munich, adding up to the largest focused digital wide-format printing event ever to take place in Europe. Printer companies have been enthusiastically pre-registering for the event via the event website at www.fespadigital.com, with close to 5,000 individuals registered so far, and 50 new registrations received every day since the beginning of March 2011.

This year's show is the fourth in the Digital series which was hosted in Amsterdam in 2006 and 2009, and in Geneva in 2008. The move to Hamburg for 2011 will appeal to printers from all over Europe, but the location is proving particularly attractive to delegates from northern Germany, Benelux, Scandinavia, the Baltic States and eastern Europe, in particular Poland.

Managing Director of FESPA events, Frazer Chesterman, observes: "When we last staged FESPA Digital in 2009, our industry was in the throes of a deep recession, yet the show still attracted 9,682 digital print 'Revolutionaries'. Times change, our community is forging ahead with increasing optimism, and the talk now is of 'Evolution', which we at FESPA define as 'growth through adaptation'. At this year's event, we'll be concentrating on the characteristics that print service providers need to adopt in order to survive and thrive in this changed business landscape.

"There are plentiful examples of that evolution in the digital marketplace, of printers who are achieving continues and renewed success with new technologies, innovative materials, more efficient workflows, creative products, different business models or go-to-market plans," Chesterman contiues. "FESPA Digital 2011 will share their best-practice examples, and the combination of supplier exhibits and educational elements is designed to motivate other printers to follow their lead."

AN EXTRA DAY WITH GREATER VISITOR CONTENT

FESPA Digital 2011 has been extended from the traditional three days to four, giving exhibitors additional scope to engage in meaningful discussions with serious buyers, and enabling FESPA to set aside time on the final day to offer 'The Big Idea'. This is a programme of content targeted specifically towards creative decision-makers from agencies and corporate marketing departments who are looking at how they can integrate wide-format print into their marketing mix to maximise impact and boost response levels from target audiences.

For the first three days of the show, Digital 2011 visitors will also have access to FESPA Fabric, the campus-style satellite event concentrating on garment printing and promotional wear, with exhibits of hardware and materials for screen and digital printing, embroidery, embellishment and garment finishing. The event features the Fabric Live! Fashion Show, hands-on T-shirt printing workshops in Charlie's Corner, an educational conference moderated by textile printing expert Scott Fresener, and the Apparel Store, a new, contemporary, retail-style showcase of quality pre-print garments from a line-up of industry-leading suppliers.

FESPA Digital moves to Hamburg, Germany's second largest city.

As in previous years, the make-up of FESPA Digital clearly reflects the prevailing industry trends. Alongside the many expected innovations in digital output, visitors can expect to see significant developments in software and workflow automation, meaningful advancements in finishing and mounting, and the widest ever selection of substrates optimised for digital print. The reviving interest in environmentally sustainable print will also be a dominant theme, with the majority of exhibitors sharing solutions that reflect this growing concern among buyers of wide-format print products, following the clear price orientation of the recession years.

The current boom in textile printing, and the expanding use of digital processes for industrial applications like ceramics and glass, will also be reflected by exhibitors around the show. Textile will, of course, will be the focus of the third FESPA Digital Textile Conference, which takes place on 25 May (day two) alongside the show-floor, moderated by John Scrimshaw, editor of industry authority publication Digital Textile. Education continues beyond the conference, with a series of knowledge-sharing sessions taking place throughout FESPA Digital in the Showcase Theatre, and in the Fresener's Fabric programme within FESPA Fabric.

Following closely on the contest at the recent FESPA Americas event, the world tour of the show-stopping FESPA Wrap Cup Masters continues in Hamburg, to be followed in Asia in October this year. The winner from Hamburg (and from next year's FESPA Digital show in Barcelona, Spain) will join the winners from other regions at a grand finale at FESPA 2013 in London.

Chesterman concludes: "Ours is a dynamic industry, with print service providers constantly reshaping their offering to respond to shifts in customer demand, and developing new niche applications and specialisations. Great digital wide format print never ceases to be exciting and inspirational. With FESPA Digital 2011, our aim, once again, is to give our community an event to match." ■

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INTERNATIONAL AUDIENCE BENEFITS FROM DUAL-THEMED MEMBRANE SWITCH & ADVANCED FUNCTIONAL PRINTING EVENT

The joint Membrane Switch Symposium and Advanced Functional Printing 2011 conference and exhibition was successfully staged in March in Düsseldorf, Germany.

The highly successful Advanced Functional Printing 2011 event offered an international audience a series of presentations covering the best practices, as well as offering an invaluable insight into the latest technologies available. At the same time, the Membrane Switch Symposium detailed the latest advanced technologies for membrane switch and industrial graphics manufacture in this important industry niche.

CONFERENCE PROGRAMME

In total, 140 attendees from 19 different countries enjoyed the following technical presentations from industry experts:

- *Recent developments in PEDOT/PSS – formulations and ink printable electrodes* ***Agfa Materials***
- *Screen printable piezoelectric polymer composites functionalised for keyboard applications,* ***Algra***
- *Integrated functions with polycarbonate films (decoration, hard coated films, FIM, tactile feedback by electroactive polymers, PE),* ***Bayer***
- *Digital inkjet printing solutions for MTS applications,* ***ColorGATE***
- *Understanding the electrical and mechanical properties of materials used to print membrane switches and other printed electronics,* ***Conductive Compounds***
- *New developments in digital printing of graphic overlay films,* ***Folex***
- *The major development trends of polycarbonate films,* ***GC Limited***
- *Functional stencil technology – from micro-fine, think to ultra coarse, thick layer,* ***Kissel + Wolf***
- *Substrates for film insert moulding* ***MacDermid Autotype***
- *The 'Precision Print' Project,* ***MacDermid Autotype***
- *UV inks for membrane switch: the facts and figures plus outlook to UV inks for in-mould decoration,* ***Marabu***
- *Verifying the UV curing process (millijoules and milliwatts, measurements of confusion?),* ***Natgraph***
- *Dual-cure lacquers as protective coatings for film insert moulding applications,* ***Pröll***
- *High-end stencil and it's interaction of the components,* ***Sefar***
- *Computer to screen – secure your screen printing frames and your process,* ***SignTronic***
- *Inkjet technology for advanced functional coatings,* ***Xennia***

Leading manufacturers of machinery and consumables exhibited in the table-top area.

Peter Kiddell was one of four impressive keynote speakers.

In addition, four keynote addresses were presented. Peter Kiddell of PDS Consulting offered his views on going from good to great in screen-printing, Ed van de Kieboom of the Plastic Electronics Foundation looked at the future of functional printing, Professor Gunter Hübner from HDM Stuttgart discussed new printed electronic applications for screen-printing and Lumoza's Wouter Moons detailed an EL and advertisement business case.

If you did not attend the event and would benefit from the information presented, please contact Peter Buttiens of ESMA at pb@esma.com for the options on purchasing the papers.

EXHIBITION

The conference programme was supported by regular intervals dedicated to the accompanying table-top exhibition of leading manufacturers of machinery and consumables, including: ColorGATE, Conductive Compounds, Grünig-

Continued over

In addition to the conference programme, attendees benefitted from many networking opportunities during the two days.

140 attendees from 19 different countries were present.

Interscreen, EskoArtwork, Fimor, Folex, InkJetFlex.com, Kissel + Wolf (KIWO), MacDermid Autotype, Marabu, Natgraph, Nazdar, NorCote, Printcolor, Pröll, Roland DG, Sefar, SignTronic, Sun Chemical. Contact details and areas of activity for ESMA member exhibitors can be found at www.esma.com

ORGANISERS

Advanced Functional Printing and Membrane Switch Symposium was organised by ESMA, an association of European manufacturers of machinery and consumables for the specialist printing industry, in co-operation with *Chameleon Business Media*, publishers of *Specialist Printing Worldwide* and *Glass Worldwide* magazines. To be staged in Düsseldorf in November, ESMA and Chameleon will co-operate again to stage the fourth edition of GlassPrint – Europe's leading conference and exhibition for the decoration of flat and hollow glass. ■

A SELECTION OF COMMENTS FROM ATTENDEES INCLUDE:

"We were able to meet with several current and potential customers at the symposium, and to make contact with many other suppliers and industry participants who we were not aware of. The content of most presentations was both timely and relevant to the rapidly growing market for printed electronics applications and technology worldwide." ***Douglas Banfield, Conductive Compounds (USA)***

"It was a very good and interesting conference with a lot a high level speakers. Not being a screen printer, it made me realize what incredible number of technical applications are covered by screen printing. In these specialty markets we have to analyze what digital printing can bring." ***Emmanuel Swolfs, EFI (Belgium)***

"Our compliments for the excellent event ESMA have held in Düsseldorf. An event full of survivors that believe on our Screen Printing common future and had the opportunity to "digest" top quality, informative and professional presentations that clearly show a future vision for many new "Opportunity" applications on "thin" and "thick" screen printing industrial perspectives... if we want!" ***David Forrester Zamith, Ruy de Lacerda & Ca. Lda (Portugal)***

"The workshop was perfectly balanced between practical, hands-on information and on the other hand a solid scientific content and exciting new developments." ***Bart van Duffel, Sirris (Belgium)***

Further information:
web: www.advancedfunctionalprinting.org and www.membrane-switch.org

KNOWLEDGE IN DEPTH

The market is recovering more slowly than expected. Not all European countries see the same revival and there is an increasing need to find new business in new applications and industries.

Peter Buttiens

ESMA is trying to help explore these new markets not only through conferences and committees but also via the concept of innovative workshops. It is looking forward to launching these events to build more market and application knowledge between printers and manufacturers. The initial sectors to be covered are glass, textiles and advanced functional printing. The workshops will bring together printers and manufacturers with consultants and the press.

More information will be available in the next newsletter but ideas for interesting topics and enquiries from delegates are welcomed by e-mailing pb@esma.com

ESMA is also officially announcing its Sportswear and Fashion T-Shirt Printing and Production conference. This ESMA sponsored event now has a firm date of 3 February 2012, which is the second day of the TecStyle Visions exhibition in Stuttgart. It will be held in co-operation with TV-P magazine. This targets the niche market applications in sportswear and T-shirt printing in Europe with the latest technologies in printing and design. It covers the high-end market, which has gained a strong position in Europe and can still be very lucrative.

ESMA: Digital Workgroup – Quality Assurance Project.

This has been given an initial start from a small group of members from the digital committee. The group will build and test a model to define a level of Quality Assurance for a number of applications, and it even includes specific factors such as ecology and sustainability. More information will be provided in the next meeting of the digital committee or through the newsletter and from the ESMA website. The workgroup will be expanded over time with additional manufacturers and suppliers.

An external project to integrate RFID, so that it supports the workflow of screen-printing for control and safety, is being promoted by ESMA as a project which will turn into working support for customers and manufacturers. To spread the work and the knowledge about this potential, ESMA has created a website in German and English. This provides an initial brief and information about the current situation and its future. More information can be found by visiting http://www.esma.com/rfid/ ■

Peter Buttiens is CEO of ESMA

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ESMA
Driving Print Excellence

NORTH AMERICAN REPORT SHOWS STATE OF THE SPECIALITY GRAPHICS IMAGING INDUSTRY

Dan Marks shares some insights to the American graphics market based on a survey undertaken in the latter part of 2010.

The speciality imaging industry continues to grow and diversify. Emerging technologies are helping graphics producers worldwide enter new markets, create innovative products and improve their competitive position.

In 2010, the Specialty Graphic Imaging Association (SGIA) collected and analysed data from 462 companies in the North American graphics and sign industry. The sample was predominantly from the USA and tended to be the larger printers, both SGIA members and others. The wealth of information received provides the SGIA community with a unique view of the current and future state of industry technology, markets, products and more.

The following information is a sampling of the 'imaging intelligence' acquired by SGIA. Additional survey data, compiled from the last four years, can be accessed by members at SGIA.org, keyword: Surveys.

INDUSTRY GROWTH

Digital imaging and multi-technology shops comprise a strong majority of this industry segment. The graphics and sign community entered 2010 with a high level of optimism, with only 5.7% of businesses expecting negative growth for the year. Conversely, more than 55% of companies expected between five and 29% growth. As SGIA collects similar information during 2011, it will be interesting to see how specialty imaging companies view their business prospects during an economic recovery.

TECHNOLOGY MIX: GRAPHICS AND SIGN	
Exclusively digital	43.8%
Multi-technology, primarily digital	27.8%
Multi-technology, no process dominating	9.8%
Multi-technology, primarily screen	17.5%
Exclusively screen	1.0%

Source: SGIA Surveys & Statistics

WIDE RANGE OF TECHNOLOGY

Wide-format digital printing – now fully mainstreamed – has become the primary technology of this industry segment. SGIA's survey data indicates that digital-only and multi-technology facilities make up 99% of the companies serving this industry segment. Graphics and sign facilities using only screen-printing technology comprised only 1% of this segment.

Speciality imaging companies continue to be interested in upgrading their digital equipment or adding additional capacity to their facilities, as evidenced by the three-quarters of companies that planned to purchase a digital machine during 2010. The technology drivers that are of highest importance to these companies fit well with the inherent offerings of digital imaging technologies in general. The top three technology drivers reported were short-run capability, resolution/image quality and delivery time.

As companies have sought to differentiate their businesses within increasingly competitive markets, many have looked to print finishing technologies and other post-print steps to bring added value to their customers. In fact, SGIA witnessed increased use of nearly all post-print processes, including shipping and fulfilment, used within the industry. This is not surprising, given that finishing technologies can provide the greatest opportunity for both market and product diversification.

PROFIT GAINING MARKETS

The retail sector continues to be the strongest market for graphics producers. They are finding new ways to support the retail sector in order to increase their value to the customer and improve revenue opportunities.

In 2010, health care institutions, educational institutions and the non-profit sector presented growing opportunities for graphics producers. In general, almost every market received more attention as graphics producers worked to diversify. While most markets served maintained their value to graphics producers or grew for a substantial segment of the community, only the retail sector and health care institutions were seen as growing markets by more than 50% of respondents. Environmental graphics, interior decorators and designers, corporate branding and government agencies were very strong as well.

LATEST PRODUCT TRENDS

The retail sector accounts for much of the production completed by graphic imagers. Retailers know that consumer purchase decisions are being made closer to the product and this realisation has shifted advertising dollars from expensive TV and magazine advertisements to more cost-effective, point-of-purchase components and environmental graphics. Banners, decals, point-of-purchase graphics, floor graphics, building graphics, window displays, indoor wall graphics and many other products were strong areas for graphic imagers. Products associated with construction understandably slipped as the construction sector continued to struggle from economic challenges.

Among the growing product categories, environmental graphics and building wraps topped the list, while billboards are expected to decline the most. Many billboards are being replaced by electronic signage or regulated by sign codes, and therefore, seen as a strong decline.

TOP TEN PRODUCTS: GRAPHICS AND SIGN	
Banners	80.4%
Point-of-sale/point-of-purchase	72.2%
Window displays	71.1%
Decal/label/sticker	69.6%
Indoor wall graphics	64.4%

TOP FIVE MARKETS: GRAPHICS AND SIGN	
Retail stores	75.7%
Corporate branding	71.5%
Advertising agencies	67.8%
Non-profits, associations, organisations	67.2%
Food services	60.6%

Source: SGIA Surveys & Statistics

ON THE FOREFRONT

In addition to SGIA's Surveys and Statistics resource, the best way to stay on top of the evolving industry is to see it first-hand at the 2011 SGIA Expo (New Orleans, October 19 to 21). As the North American gateway to the global imaging marketplace, the expo presents an unprecedented opportunity to experience the widest range of innovative technology and to gain inspiring and profitable business ideas.

This year's Expo offers something for every imager. Don't miss SGIA's exclusive demonstration areas – the original zone experience – for each sector of the diverse speciality imaging community. The Digital Signage Zone, Industrial Application Zone and PDAA Graphics Application Zone feature the latest technologies to support new markets and total solutions for your customers. In between

Continued over

hitting the expo floor, attendees can take advantage of focused educational sessions led by industry experts and exciting networking events to build strategic business relationships. Learn more at SGIA.org, keyword: 2011Expo. ■

Dan Marks is VP of Markets & Technologies for the SGIA.

Publishing Director's Comment:
We anticipate publishing further reports on the industrial and textile printing segments based on last autumn's survey in future issues of Specialist Printing Worldwide. Bryan Collings

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DRAMATIC NEW EDUCATIONAL SERIES EMERGES AS COMMUNITY NEEDS CHANGE

Michael E Robertson looks at forthcoming conferences planned for graphic imagers

Michael Robertson

With the successful adoption of digital imaging technologies, the competition points between graphic imagers have changed – and changed dramatically. It wasn't long ago when the complexity of making a print made image quality and consistency the defining competition points among graphic imagers. In today's marketplace, graphic imagers no longer compete on quality of print. High-quality, consistent images are a given. Instead, they are competing on value-added services before and after the print.

SGIA's new Business Development Conference Series will help community members improve their ability to find and maximise opportunities to add value beyond the print. The series will focus on leading markets served by our community. The retail sector is the first market on which we'll focus.

More than 75% of the SGIA community serves the retail sector in one way or another; whether it's point-of-purchase (POP) materials, environmental graphics, OEM markings or saleable products. The first Business Development Conference, 'Improve your position in the retail supply chain', will provide a valuable insight into the issues and challenges faced by retailers and brand managers. It's only through a better understanding of the customer that graphic imagers can create additional value. The Business Development Conference Series will draw on the expertise of retail specialists, print buyers and brand managers to look inside the retail sector and explore opportunities for graphic producers. This conference features two days of in-depth sessions and case studies presented by experienced leaders in the retail sector. Educational discussions include:

- How the relationships between suppliers, retailers, and third-party providers have been fundamentally altered – and how to take full advantage
- What your company can do to combat 'commodity hell' at the retail level
- How to differentiate your company's strategies – on both sides of the retail 'table'
- How better to understand and navigate the retail sector
- Getting ahead of the competition in the retail supply chain
- Improving profitability in this growing market

In the conference's expert panel discussion, 'Winning at Retail: Separating the RFP winners from the RFP losers', Jay McLoughlin of ReThink Fabrics, Brad Green of The Integer Group, Carol Spieckerman of newmarketbuilders and Martine Padilla of Sophizio (who has represented clients such as Godiva, The Walt Disney Company and Toyota Motor Sales) will unite to discuss future opportunities and best practices for graphic communications firms in the retail sector.

It's clearly time for a new direction in educational programming, and SGIA is pleased to provide it. The community needs to change its value proposition to avoid commoditisation. Graphic imagers who are finding themselves mired in the commoditised graphics race will have an increasingly difficult time improving their profitability.

Don't miss this unprecedented Business Development Conference (Denver, CO, USA, May 11 and 12, 2011) focuses on improving your position in the retail supply chain. For more details and to register, visit SGIA.org, Keyword: BusConf. ■

Michael E Robertson is President & CEO of Specialty Graphic Imaging Association (SGIA)

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