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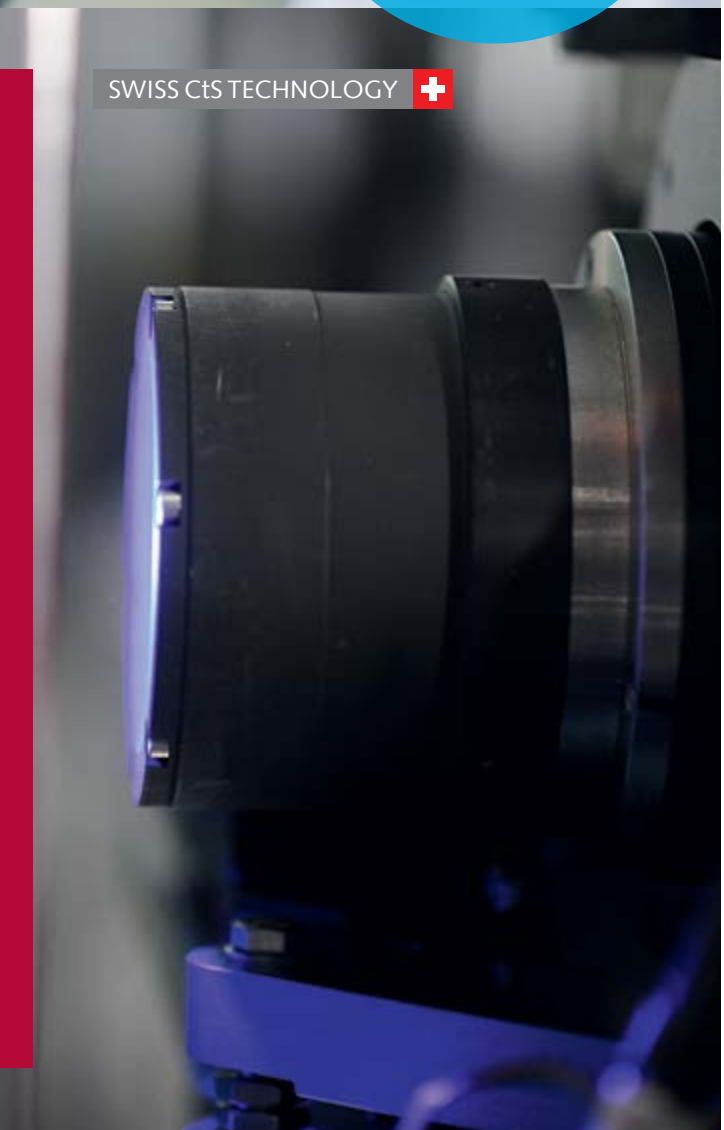

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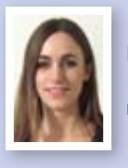

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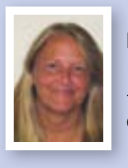

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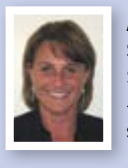

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PROTOCOLS THAT PAY

Douglas Grigar and Mark Clewell show how proper screen care and cleaning can improve profitability

Screens are the lifeblood of a screen printing operation, so your company's profitability can depend on how well you maintain imaging performance while minimising cleaning time and material costs.

The industry's most popular screen construction – monofilament polyester mesh on static aluminium frames – delivers 100,000 to 200,000 quality images when cleaned and handled properly, but improper screen care can erode profitability in multiple ways:

- Punctures or weakened glue bonds can cause premature screen failure. At €12–€16 per screen – depending on mesh spacing – screen replacement costs can erode profits.
- Inappropriate cleaning can cause fibre degradation, poor imaging performance and high reject rates.
- Excessive use of water or cleaning agents literally washes profits down the drain.

Review your cleaning protocols periodically to help identify problems with screens, or deficiencies of chemistries that should be replaced for superior results. Consult your screen printing supplier for cleaning agents compatible with your needs.

IMPROVE SCREEN IMAGING QUALITY AND LONGEVITY

Step 1: Ink Clean-up

Ink degraders for solvent-based inks and plastisols are notorious for damaging cyanoacrylate and urethane glues that bond mesh screens to frames. Do not allow screens treated with ink degrader to remain upright for an extended time since the cleaner can puddle on the bottom frame and attack the glue. Restrict chemical exposure time to a minute or less by cleaning screens in small batches using a compact washout station such as a Vastex VWB-3621.

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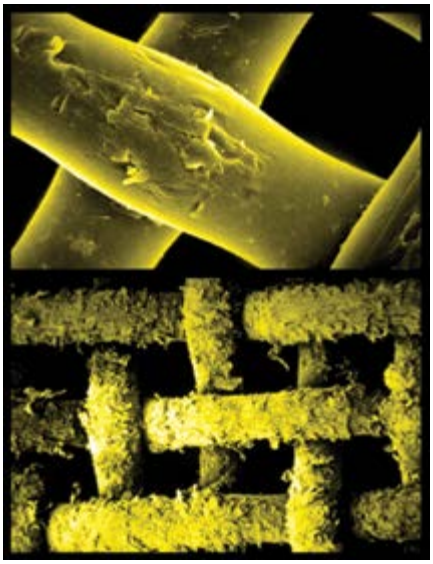
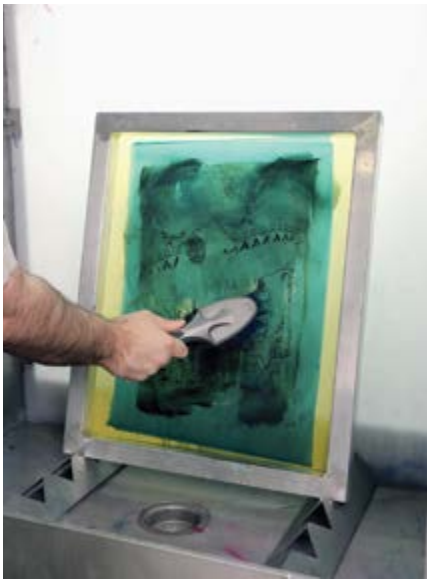


Micrograph shows mesh damage caused by abrasive cleaners that can impair image quality (courtesy SEFAR US)

Clean screens in small batches using a VWB compact stainless wash station



After applying ink degrader, agitate with soft bristle brush

Rinse first at low pressure to minimise splashing of cleaning chemicals

Finish with high pressure rinse to maximise contamination removal

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Use a brush dedicated purely for degreasing

After removing any excess ink, apply the minimal amount of ink degrader needed on both sides of the screen, and agitate with a soft nylon-bristle brush. Rinse under low pressure on each side to remove the cleaner and contaminants without splashing, and then finish with a high-pressure rinse on each side. Pressure washing can pay for itself in a matter of months by minimising water use.

Avoid ink degraders that are not designed for plastisols because they can lock in the emulsion.

Also, never use mineral spirits as a low cost alternative, since they become an environmental hazard when washed down the drain.

An enclosed drying cabinet with controlled, heated and filtered air flow and horizontal drying racks offers the best way to finish drying screens

Step 2: Emulsion Removal

Acids used to soften the emulsion for removal will not attack the glue holding the mesh to the screen. However, if the softened emulsion is allowed to dry, it can become permanently affixed to the screen. Apply acid to both sides of the screen and agitate with a soft nylon-bristle brush. Clean each side with a low-pressure rinse, followed by a high-pressure rinse.

Step 3: Stain Removal

Perform this step only if stains remain after the first two steps. Untreated stains can make it difficult to produce a clean image on the next print run. Match your cleaning agent to the specific need, since an ink stain in the knuckle of the mesh will require a different stain remover than a yellow-brown stain caused by underexposed diazo emulsion. Follow with low-pressure, then high-pressure rinses.

Step 4: Degreasing

Degreasing is a critical final step for removing all residues prior to recoating with emulsion. Using generic janitorial degreasers can lead to print quality problems.

Select cost-effective degreasing agents formulated specifically for screen printing that are chemically compatible with your screens and processes. Unlike some generic cleaners, proper degreasing agents do not contain abrasive grit that can damage the screen mesh, increase cleaning difficulty and/or shorten screen life.

Use a brush dedicated exclusively to your degreasing process to avoid re-introducing chemical residues from earlier cleaning steps. Also, rinse only with low pressure to avoid splashing wash-sink contaminants onto screens.

MAINTAIN CLEANLINESS THROUGH CONTROLLED DRYING

Avoid drying screens in front of fans that can blow dust onto damp surfaces. Remove the majority of excess moisture from clean-rinsed screens with a wet/dry shop-vacuum head designed for screen mesh, and then finish drying in an enclosed cabinet designed for this purpose such as a Vastex Dri-Vault screen drying cabinet in which controlled heated and filtered airflow dry screens quickly without contamination. Horizontal stacking of screens in the cabinet prevents streaking from residual contamination dripping down a vertically oriented screen. ■

Douglas Grigar is Master Screen Printer/ Consultant and Mark Clewell is Sales Manager at Vastex

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TOOL TIME

Alan Buffington explains why you should never neglect your screens

As a kid growing up I was fascinated by my friend's older brother whose hobby was to work on his hot rod Chevy. His endless assortment of tools was always a source of pride for him and a curiosity for us. They were all neatly arranged on a pegboard in his dad's garage with outlines to keep them where they belonged. He had many tools that we had no knowledge of. When we asked often enough to try his patience he would try to explain timing lights, torque wrenches, feeler gauges and other odd looking bits of metal to three ten-year-old boys.

"Each tool has a specific purpose," he would explain and then go on a long lecture like a college professor as he tweaked some obscure screw on a carburettor. When we reached blank stares indicating our comprehension was gone his lecture would drift away and he would disappear under the car and swear most of the time. I would remember his unique language skills many years later when I tried to repair my first automatic press that had suddenly stopped working. Language like his comes in handy at midnight with a huge job due in the morning and a press that won't cycle.

Tools are important. They either do the job correctly, or they don't. A good tool is often cherished and well taken care of and put in its place on the pegboard or organised in a large red chest with multiple sliding drawers. The investment in a better tool to do the job has rewards. You have more confidence in a repair when it's done right. You gain an appreciation for the engineering that went into the tool, but more importantly you love how it performs. A well fitted box end works the moment you use it, while a crescent wrench that serves a similar purpose loses its grip and busts your knuckles more often than not. Any auto mechanic knows his work depends on his tools and his job is made easier with good tools that work.

In Screen Printing we have many choices to make when it comes to tools. Which press to buy? What exposure unit? What software? And so on until the shop becomes operational. One of the questions I ask screen printers is: What is their best tool? I had asked this of my friend's brother and he held up a set of ear protectors that blocked out all sound and put them on and dove back into the engine compartment with a flashlight.

WHAT IS THE BEST TOOL IN YOUR SHOP?

The tools we use in screen printing are varied. One textile printer proudly pointed to his 12-colour press and smiled knowing that he would never have to print by hand again.

"This baby is the best tool in my shop; it prints 800 pcs per hour easily," he said.

There is a fascination with automatic presses popping out a shirt every 4–6 seconds. Owners run the maths through their heads. Hourly production times the print charge and then how many could he print in a day, then a week, and before you know it he has a new boat picked out to buy. Okay, even if his figures told him he could finally take a check, watching an automatic press seems to easily win the title of best tool in the shop.

But what does it do in your shop that it couldn't do in another shop? I mean there are lots of 12-colour presses in this world. If they were the best tool wouldn't they all make a company successful beyond all expectations? So if company A has a 12-colour automatic press, and company B has the exact same 12-colour automatic press and both companies bid on the same job, why would company A get the majority of that work?

The press registers pallets. They cycle endlessly to bring pallets to an exact stopping point to stay in register with the previous heads' prints. They register platens and hold squeegees that go back and forth and are engineering marvels that can effortlessly churn out thousands of shirts in a day. But how does a company win the work when so many companies have the exact same press or a similar one?

Maybe it's the pre-press tools. Could Company A have better computers, software, or personnel? Only the last one could be radically different, but calling your Artist a 'tool' usually has negative consequences in today's slang. Yes artists and separators can make a huge difference, but again they aren't tools, they are under-appreciated skilled artists/computer techs/separators that in most cases are better left to their own path for good results. Just slide the work order under the locked door into the dimly lit room and wait for the film has worked for me in many shops.

THE IMPORTANCE OF SCREENS

No, the best tool is what you print with. The press only holds this tool, and if it isn't right, no amount of equipment or personnel can fix the problems it creates.

The screens you print with are the most important tool in your shop. Yet, in so many shops I go into, it is treated like a piece of plywood. Thrown around, dragged across the floor, stuffed into dusty rooms while the emulsion is wet, subjected to high humidity, ink and tape left all over the frames and never polished and put back carefully like a good mechanic treats his tools. No, they are often stacked in piles hap hazardously and one door away from the garbage bin.

Continued over

As a child, Alan was fascinated by the diligent maintenance of a hot rod Chevy

A job is made easier with good tools that work properly

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Working with quality mesh and emulsion in a pristine screen room pays dividends

So maybe Company A chooses better low elongation mesh with thinner threads and stretches to optimum tension levels and treats them well to get maximum life out of them. Or they choose an emulsion that won't break down and exposes the emulsion on an exposure system capable of the highest resolution and exposure strength.

The screen is often viewed by many as an inky mess that needs cleaning, rather than clean, well exposed money-making stencils that will create wearable art. We are in a craft industry where the craft skill can come down to mesh and emulsion selection to reproduce exceptional art that most industries never see the likes of. Even if the art is simple, it has to be printed on time, crisply, with good opacity and a soft hand for customer satisfaction. Working with quality mesh and emulsion in a pristine screen room pays huge dividends on press.

QUALITY MESH MAKES A DIFFERENCE

The combination of *quality mesh* stretched to optimum workable tensions and a *high resolution, durable emulsion* suited for the inks you use is your best tool. Not just your best tool, but it is the final production step for your product, the print, your main source of income. Automatic presses hold pallets and screens in register but they need quality screens to create stunning images and print as close to non-stop production as possible. A good screen on one press is a good screen on any press. The screen is what you make your money with and when it is treated and viewed as your best tool all the prints you produce become a continuous business card for your company, with sales that follow from your quality prints.

Low Elongation Mesh is a term we have grown accustomed to and assume that it applies to all mesh, it doesn't. Mesh looks similar but has many quality levels from manufacturer to manufacturer that can't be seen without using it over many jobs and looking at production yields and print quality to see improvements. Retained tension is a key area to look at. When the mesh is stretched to optimum tensions will the retained tension after a long job still be a good working tension on your static screens? Or does the mesh continue to lose tension as time goes by? Performance always depends on the best tools to do the job. Smartmesh retains tension, has balanced warp and weft thread in response to the squeegee pressure, and holds precise registration. As a tool it simply works better: better tools = better results.

In print this would show up as more opaque base plates with S Mesh or LX Mesh; perfect dot on dot registration; sharper prints. With a quality mesh you can push the limits of registration and design and then have confidence it will look the same print after print on press. There is still something magical about setting up a 10–12 colour simulated process job and seeing a print that looks as good as or better than the art on the computer screen. The final product you produce should make it clear to the customer that you have this process mastered.

EFFECTIVE EMULSION

What we coat quality mesh with is equally important. Your emulsion should withstand full exposure and still resolve fine details. Underexposing an emulsion to get details is like under-inflating your tyres. You can get the car to go, but when it reaches a high speed, eventually the tyres will blow out. Underexpose a discharge screen and it will breakdown as well. A quality emulsion creates excellent emulsion sidewalls in the image openings with sharp emulsion shoulders to print crisp line work, accurate halftones, and does it effortlessly on press with few stencil breakdowns.

So when my friend's brother rolled out from beneath the car, he asked what we had learned.

"How to swear," we laughed.

"No, what fixed this car was good tools and knowledge," he replied as he tapped a 5/8" open end against his head. "Do it right the first time and know what you are doing," he said repeating his father's words from years ago when he was learning. We never really doubted him; he could fix a broken bike faster than we ever could.

"Hop in," was all he said. He backed out of the driveway, slipped into first gear, revved the engine and then pinned our heads to the seats and raced down a country road with three boys screaming in delight. We heard him mutter under his breath, "that's the way it should work."

Is the most important tool in your shop working well? ■

Alan Buffington works in Technical Sales at Murakami

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HYBRID THEORY

Alex Mammoser and Harvey Knapp discuss the advantages of hybrid printing

For many years our industry has been looking at direct-to-garment printing, trying to make it more versatile, efficient and cost effective. While some companies have come a long way with the technology and their ability to incorporate more fabrics and inks, standard DTG is still a long way from being a viable high volume printing solution.

As with everything in our world today, technology seems to be moving at the speed of light, and while it may appear that our industry is lagging behind compared to the advancements in phone and mobile technologies, the truth is we are changing and adapting very quickly!

DIGITAL + TRADITIONAL

There are many companies focusing on advancing the DTG world in leaps and bounds, but there is an even larger segment of companies (some familiar to us in the screen print world and others emerging from different portions of the digital computer technology realms) focusing on what is commonly referred to as 'hybrid printing': the combination of digital printing and traditional screen printing. In hybrid printing the base colour (underbase) is screen printed (usually with a water based ink) and sometimes a clear layer is screen printed atop the white underbase to help bond the digital layer to it. After that an inline digital printer lays down the CMYK ink over the underbase, and then a wide array of special effect inks or spot colours can be added via screen print.

Hybrid printing solutions combine the high resolution of digital printing with the speed and cost savings of screen printing

ADVANTAGES OF HYBRID TECHNOLOGY

Can print on most fabric types: With DTG technology the inks are limited as to the types of fabrics that the user is able to print on. Traditionally 100% cotton was needed to make DTG commercially viable. Today we see that changing slowly, with companies making available pre-treatments to block dyes from migrating on synthetic fabrics. But the reality is that the process is cumbersome when trying to produce high volumes. Hybrid printing allows printers to work easily with a much wider array of fabrics.

No pre-treatment of fabrics required: Pre-treating fabrics has always been the added step needed in DTG printing; anyone familiar with DTG will tell you that this step is the Achilles' heel in the process. Incorporating screen printing into the mix has allowed this step to be eliminated, greatly simplifying and cutting processing time for each garment produced,

Side view of M&R's DS-4000 Digital Squeegee hybrid printing system laid out on the Stryker automatic oval screen press

eliminating waste and reducing cost.

Infinite number of colours: thanks to CMYK gamut and ability to screen print spot colours.

A large advantage that hybrid has over DTG and screen printing as individual processes is that hybrid printing has the ability to get the strengths of both processes and eliminate the weaknesses of each, particularly when it comes to colour gamut. An example for each would be DTG-producing exacting PMS colours when printing a corporate logo – very difficult if not impossible. Using a hybrid press the artist creating the art would simply make a spot colour and screen print this particular portion of the image. For screen print, trying to reproduce an accurate flesh tone on a black fabric is usually extremely challenging. With hybrid printing, the artist would print this portion of the art using digital printing heads; the end result: a perfect corporate logo colour match and stunningly realistic flesh tone on a black fabric.

High production speeds: 400 35x45cm prints per hour. Digital printing has largely been limited in production due to the limited amount of printheads and the way that the head array scanned back and forth many times. With the new larger hybrid units available having wide arrays that can imprint the entire garment in just a few passes, and the ability to produce 400 [prints] per hour, shops are now able to achieve ROIs (return on investment) that justify investment in the technology.

Low cost per print: ($0.10–$0.20/£0.07–£0.15) plus base ink cost. In the past, the high cost of underbasing a DTG print – with DTG white ink using a pretreatment – slowed the technologies' advancement. The newer hybrid technologies allow the users to print a low cost underbase, screening specifically designed water based inks and printing the lower cost CMYK inks over the top.

Lower MOQ compared to screen: (minimum order quantity). Screen printing has always had the issue of a high MOQ to colour count ratio. In order for screen print shops to be efficient and have an ROI they can maintain, generally speaking you cannot order a 10-colour print on 48 shirts. This is now possible with the use of hybrid technology.

Flexibility: Inline printer or screen print press can be used independently. Based on art and type effects to be printed the artist and operator can choose to use either traditional screen printing only, only digital or a myriad of combinations of both, hybrid.

AN EXCITING FUTURE

Ultimately the very things that have made screen printing challenging are those that will keep it alive; in hybrid printing we see the next step in the evolution of garment printing. Based on the limitations that pure digital printing has at this moment, it seems that screen printing will be a big part of the process – there is no possible way for specialty inks like metallics and phosphorescents to be fired from an inkjet nozzle. Hybrid is an exciting new way to approach garment decoration; it offers a multitude of avenues for artists to create designs with fewer limits, an opportunities to create images that were previously impossible to produce. ■

Alex Mammoser is Sales Manager at Easiway Systems and Harvey Knapp is a Regional Salesman at T&J Printing Supply

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INKJET INVESTMENT

Simon Daplyn explains where to start when considering inkjet

As industrial markets see the benefits of digital printing to their business and the need for shorter runs of print and personalisation grows, the challenge for many companies is where to start. Digital printing has the age-old conundrum of "what comes first the chicken or the egg?"

For many the printer carries the highest capital investment and so is the first priority, for others the choice of printhead dictates direction and for some, the chemistry will drive the decision. When looking at inkjet for a new project or for the first time in a particular application, there are a number of things to consider.

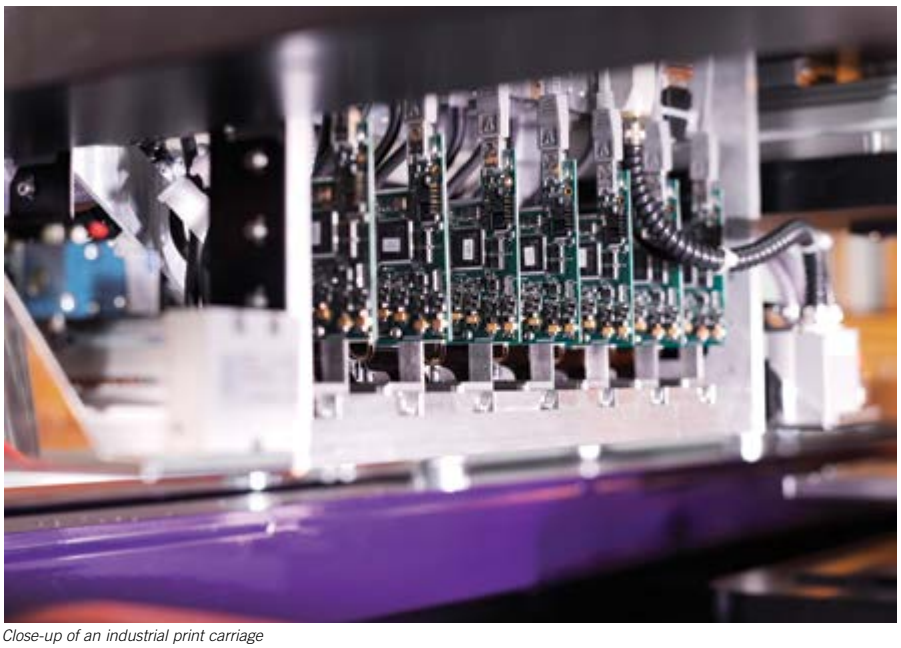
High shear mixing of a digital ink

THE IMPORTANCE OF INK CHEMISTRY

In any application, the ink defines the performance and ultimate acceptance of the print and application. The ink decides the function of the print and ideally is a primary consideration in any discussion of technology adoption. The hardware, whilst critical for the delivery of the ink, is essentially just that, a deposition tool. If the ink chemistry is wrong it can influence the application performance, the fastness, the colour, the quality and so getting the choice of ink right is often the critical step in the adoption of digital printing into industrial applications.

DEFINING THE PROCESS

In markets with ever changing regulatory requirements, the ink type can be critical. Recent years have seen a strong market pull for water-based solutions due to its eco credentials and the compliance needs of many industries. The selection of water as a carrier rules in or out a number of hardware options in terms of printhead and system requirements again pointing to selection of ink chemistry as a critical step in defining the overall process. Certainly, ink choice will dictate the choice of drying or fixation method be it UV curable, solvent with heaters, or water-based which may need critical temperatures to promote fixation. The choice of ink will also dictate the need or not to prepare the substrate prior to printing. Typical preparation of a substrate may involve cleaning and priming with a wet chemistry or by using corona, plasma or flame treatment. If the ink chemistry can avoid this initial process step, it can have a positive impact on throughput and total cost.



Close-up of an industrial print carriage

Ink samples prepared for particle size analysis, a critical specification for printhead performance

THE PRINTHEAD

One of the major factors in the rise of adoption of digital printing in industrial print markets is the evolution of printheads. Advancements of printheads with different nozzle configurations and densities, widths, print frequencies have contributed to increasing the speed, quality and efficiency of the digital print process. In many emerging applications, the print quality and requirements of the head are a primary consideration. For example, it is widely accepted that high quality packaging markets will require 1200dpi resolution to meet the demands of the market and brands. This means that many OEMs and project leaders look at the choice of printhead first and try to match an ink chemistry. This approach is successful when the provider of the ink has the capability and is open to develop a solution for the application with the printhead and process in mind. One major benefit of working together with a printhead partner is the ability to control and tune a waveform to give the best possible jetting performance of the ink.

SYSTEM INTEGRATION

For many applications it is difficult to find an off-the-shelf solution to meet all of the technical requirements. In many instances, industrial printers are looking to add inkjet printing capability to an existing production line and even when an offline printer is acceptable, the full end-to-end process may require something non-standard. For this, system integrators are critical. Companies able to take printheads, electronics, and software to implement a solution with an existing or custom transport system are making the dream of inkjet a reality for many industrial users. The key challenge is in managing suppliers of the hardware, software and ink to bring together a coordinated delivery.

CONCLUSIONS

Implementation of digital printing within a new industrial application can be challenging and starting with the right questions often dictates success. While tempting to look at the largest initial capital investment as the most important factor, more critical to success are the choice of ink chemistry and printhead. In fact, over the life of a printer, ink and consumables can often be a greater investment than the printer itself. The ink has the greatest influence on the final performance of the print; the printhead and software being key to producing a print of the right quality. The ultimate requirement of a printer is to add design or function to a specific substrate. If the ink does not fit, in terms of print and application performance, the printer cannot improve the result. An ideal scenario is to discuss requirements with ink and printhead manufacturers simultaneously. This can allow a close collaboration to optimise the performance of the ink, tuning with a waveform and full compatibility testing to ensure maximum performance and a shorter development time.

Sensient's years of experience in developing water-based digital inks combined with an extensive knowledge of regulatory and quality requirements make them an ideal partner for OEMs, integrators and industrial companies when considering inkjet for a new application. ■

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UNDERSTANDING aNIR

Dr Kai K. O. Bär reveals how advanced NIR technology can enable new textile printing processes and products

The drying and fixation steps, either for indirect sublimation paper printing or direct textile printing processes are always mandatory. Their role becomes more important with the development of new printing equipment, due to increased productivity, environmental and energy efficiency requests.

In addition, new design concepts for textile printing options or new textile materials require dryer performances which are far above today's hot air, steam heated or hot drum-based drying/fixation systems capabilities. But with application and integration of the advanced NIR (aNIR) technology, some major limitations can be overcome.

WORKING PRINCIPLE OF aNIR TECHNOLOGY

A special light – the so-called near infrared – as a high energy source is combined with a warm high velocity air ventilation to suck evaporated water from the wet printed/coated substrate.

The NIR-energy source shows a little heating on the sublimation paper or textile substrate, but ultrafast and efficient drying of the wet/liquid pattern whether printed, coated or dipped. In conjunction with the high velocity impingement air flow, the moisture is removed almost instantaneously from the substrate, offering an extremely quick drying system. The system puts low thermal stress on the paper or textile substrate, and surrounding machine equipment/components are dryer.

SUBLIMATION PAPER PRINTING

The aNIR-drying system provides ink penetration control by adjusting and optimising the drying and fixation process according to the applied ink, substrate and print job. Ink drying control, ink drop formation, the ink dot gain, the ink density and the substrate penetration can be precisely controlled. Significantly enhanced print quality, especially in terms of sharpness and contrast can be gained.

Ink consumption is reduced – a reduction of more than 30% can be often seen. Lower quality, lower weight and therefore lower cost sublimation paper can be used, since special coatings to reduce ink penetration or paper bleed are not necessary with an aNIR-drying system.

Finally, the resulting sublimation paper temperature after the aNIR-drying process can be reduced to 70°C or lower, even for high, low viscosity ink laydowns. This ensures flat and non-dried out printed products and also gives scope for the development of lower temperature sublimation inks in the future – even currently impossible low temperature-resistant textile materials could be produced by sublimation printing processes. **Figure 1** shows a schematic as well as typical multipath aNIR-based arrangement.

Figure 1: Schematic as well as typical multipath aNIR-based arrangement. Image courtesy of Aeoon Technologies GmbH

OTHER APPLICATIONS

The aNIR-drying system can be also adapted [to be placed] close to the printing arrangement, especially on an inkjet-based printing unit. This enables a complete ink formation, drying and fixation processes similar to that outlined for the indirect sublimation ink process.

For dried textile printing processes, this has an extra benefit: the need for precoatings and primers (to reduce ink penetration) can be highly reduced – often even avoided.

The lower textile temperature during the aNIR-drying process also permits printing on lower temperature-resistant raw materials.

In the instance of 'smart textiles', due to the reduced thermal stress on the textile substrate, printed, electronic structures and sensors can be [more easily] integrated.

Due to aNIR's fast and focused drying capability, a 3D-shape adapted dryer configuration is now also possible in conjunction with a robotic handling unit. [See **figure 3**]

aNIR can also benefit the conventional textile printing process, for example in sleeve printing carousel applications, so instead of having stationary IR-drying spots in such devices, an aNIR drying module is applied directly at the moving carousel table and dries only when the table is moving. Yes: this short period from one sleeve to another is sufficient to dry the printed pattern! **Figure 2** shows a schematic sketch of this configuration. ■

Figure 2: Schematic sketch of aNIR-drying module in a sleeve printing carousel

Dr Kai K. O. Bär is Managing Director/ President of adphos Digital Printing

Figure 3: Schematic of aNIR robotic handling unit

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Left: colour image; centre: converted to grayscale; right: converted to LAB with Lightness Channel shown

BACK TO BLACK

Charlie Facini gives step-by-step instructions for eliminating muddy prints in grayscale mode

One-colour printing is a bread and butter process for most screen printers, yet when an image is tonal instead of solid some printers produce unacceptable muddy prints. Grayscale is the print industry term for printing a single colour screen (typically black) to reproduce a tonal image such as a photograph. It's an effective use of a single screen when done well, and the basis for other creative techniques. So, what could be so hard about making a good tonal, single colour print? You just change the mode to grayscale. Easy, right?

COLOUR CONVERSION

It is often said that a good start is a good finish. A print, like a building, is only as good as its foundation. When preparing to print a tonal image the quality, clarity and dynamic range of the document are critical to screen making. Images on-screen that lack interest will deliver dull, uninteresting prints. The poor foundation comes when artists take a full colour image in Photoshop or PhotoPaint and simply convert to Grayscale. This is the moment the wheels fall off the wagon. Your print quality is doomed.

By simply converting a full colour image to the grayscale mode a muddy print will result, and it's due to what's inherently happening during the mode conversion. The image will lack tonal interest. Colour images require much more data to reproduce the colour tones (RGB uses three channels of colour while CMYK uses four channels); simply switching to grayscale mode de-saturates the colour pixels leaving the image busy and dull. There is too much data and the image is no longer a colour image, so why keep all that extra data (channels and pixels)? At this point your film or direct-to-screen image will be too heavy with lots of data in close proximity. Add to this the natural dot gain result of pressing ink through a screen onto a substrate, and you have an over saturated image that instantly loses much of its tonal dynamic range.

PREPARING A GRAYSCALE IMAGE

It's easier than you think to prepare a grayscale image for production that will translate into a great print on-press. All along you've been counting on the wrong mode. Take a colour image and go from the colour mode to LAB in either Corel PhotoPaint or Adobe Photoshop. Yes, LAB and not Grayscale. L stands for 'Lightness'; it controls ALL the Tonal values in the image, while A (Alpha) and B (Beta) Channels handle all of the colour in the image. Copy and paste ONLY the L channel to a NEW grayscale document, and you have the proper foundation to make a great one colour tonal print. Lightness used to be called Luminosity, which was a more descriptive term, but today L stands for Lightness. At least they have the 'light' part right. The root of all good photography is to control light. This is important for us screen printers too. Images that control light properly print better.

UNDERSTANDING LAB

Since the LAB mode is not fully understood by many, it's routinely passed over. Most of the other colour modes make sense to printers and graphic artists, yet LAB seems to be ignored because it does not display or control 'colour' data in ways most understand. RGB (Red, Green, Blue), CMYK (Cyan, Magenta, Yellow, Black), Grayscale, Duotone, Bitmap – all of these are modes that many users can make sense of, but what the heck is LAB (Lightness, Alpha, Beta) about? Let's not worry about the colour handling in this mode for now; our focus is on what this mode can do for us to create the perfect grayscale.

As noted previously, with colour images start by switching to the LAB mode; select only the data in the L Channel, and copy and paste this to a NEW grayscale mode document. If you do nothing more at this point you will still print a better image than selecting grayscale. Do a side by comparison with the same image you converted from colour to grayscale. That may be all the proof you need.

GOOD GARMENT PRINTING

Think you have it rough printing garments? I recently worked with a screen printer in Slovenia searching to find ways to improve printing on inflated balloons – talk about a less than friendly substrate. Struggling to reproduce tonal images, I then shared with him this


Balloon on right showcases improved quality using the Lightness Channel from LAB mode

The Bearded Male printed t-shirts highlight the print quality achievable using a properly managed image mode conversion. Shown are duotones and tri-tones. Note extreme detail in reflection in eyeglasses, high detail hair follicles, as well as teeth

technique. Even upon his first attempt (pictured) you can see just how user-friendly this process was for him. I am sure over time his technique will continue to improve along with his prints.

DOT TO DOT

A clean print comes from opening up space between the printed data. Too much data on a screen and a small amount of dot gain translates into a big problem with the print. This is why screen printers achieve better results using single angles for all screens when printing colour images (i.e. CMYK, Spot Process/Sim Process) instead of setting up multiple angles in a rosette pattern. The close proximity of the halftones creates an issue with even a small amount of dot gain. Dot gain happens; it can be controlled to a degree, but it will always happen; it has to. By having a cleaner image with more open space between the print data (halftones) dot gain will no longer be an issue, it actually reverts back to the asset it's supposed to be by increasing image tonality.

Dot gain originally described in German as Tonwertzuwachs (tonal value increase) sounds printer-friendly, but as time went on the true meaning was lost. Dot gain unjustly acquired a stigma and was associated with printing trouble. Nothing could be further from the truth, as it will always be an asset. Don't be afraid to lower the line screen to open space and achieve greater clarity. A well-executed lower line screen is better than a poorly executed higher one.

PRESERVING DETAIL

Images drop a generation in quality on-press, so a little image sharpening will ensure that what appears on-screen will be replicated on-press. The 'unsharp mask' tool works well. Play with adjustment sliders to develop desired effects and you will create a very high-quality print. If you want to get more creative add a colour to your professional grayscale.

Your foundation grayscale image can easily become an impactful duotone (two-colour), tri-tone (three colours) or quad-tone (four-colour) print. When you see clean results with the single colour print, you'll be confident to expand your options. Note: print the black separation first then the colour or colours to create stunning results. Your next level is printing on colour garments and surfaces. Open your duotone file into Spot Process Separation Studio software and auto create a tonal underbase, black and colour separation, as well as a highlight white. Now with just four screens you will be printing a top-quality image on multiple colour garments.

The Bearded Male printed t-shirts highlight the print quality achievable using a properly managed image mode conversion. Shown are duotones and tri-tones. Note the extreme detail in reflection in eyeglasses, high detail hair follicles, as well as teeth.

You now have all the information to take you from muddy to clean, and clean to creative. ■

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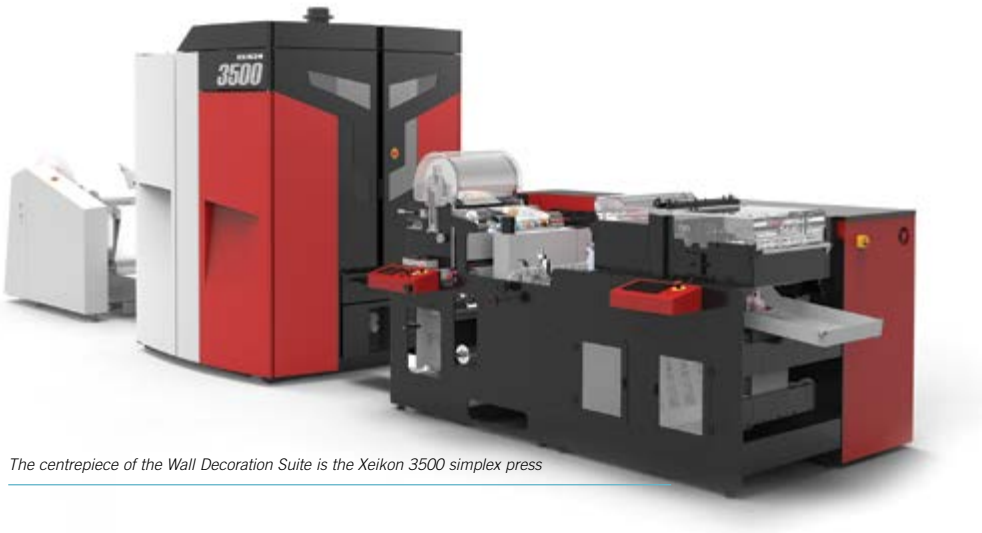
A WALL OF ONE'S OWN

It's important to have innovative wall decoration covered, believes Dimitri Van Gaever

Tired traditional wallpaper is a thing of the past. Today creatives want to design their own bespoke visions or transform engaging images into room enhancing decoration. Custom designed wallpaper, once the preserve of the rich, is now an affordable possibility thanks to the evolution of the digital print process. Interest is also growing as we get more inventive and increasingly confident with placing online orders.

It is not just the design process that digital print aids. It also addresses multiple market challenges, from expanding online services and stricter environmental requirements to reduced stocks and more custom, just-in-time jobs.



The centrepiece of the Wall Decoration Suite is the Xeikon 3500 simplex press

ROLLING OUT THE TECHNOLOGY

Conventional wallpaper printing technologies include screen, flexographic and gravure printing. The latter swiftly became the dominant process when it was first introduced in the 1950s. It quickly grew market share because it was much less labour-intensive than screen printing. The process involves engraved steel rollers which are submerged in ink. After rotating onto a blade to remove all excess ink, the steel roller transfers what's left of the ink in the engraved cells onto the substrate. While capable of beautiful effects, gravure printing has its disadvantages. For example, printing on textured substrates is challenging and only large batches make up for the cost of the custom-engraved steel rollers. Also, gravure limits wallpaper designer creativity as the pattern must repeat every 64cm.

Today more cost-effective and versatile digital technologies support fast and efficient production of personalised wallpaper. They are more accessible, qualitative and cost-efficient which has helped drive the current wallpaper revival. Unlike gravure, patterns don't have to repeat, and the wallpaper design can be sent straight through to the operator with no custom hardware needed. This makes digital the perfect solution if you know you're going to print plenty of short runs. As do web-to-print and print-on-demand strategies in general, which dovetail nicely with Millennial consumer's taste for customisation and web-to-print ordering solutions. They support just-in-time deliveries and more effective stock management as well.

DARINGLY DIFFERENT

Xeikon's solution is the all-in Xeikon Wall Decoration Suite. It is ideal for pattern wallpaper designs, with unlimited creative freedom for repeat patterns or not, custom illustration and photo murals for any private, commercial and public space and canvas wall decoration where every print can be different.

It helps operations produce shorter runs cost-effectively with faster turnaround times, supports print to order with minimal set-up and make-ready costs, eliminates inventory risks and costs and makes no compromises in quality with true 1200dpi printing quality. It complies with environmental legislation.

There are five components. Depending on

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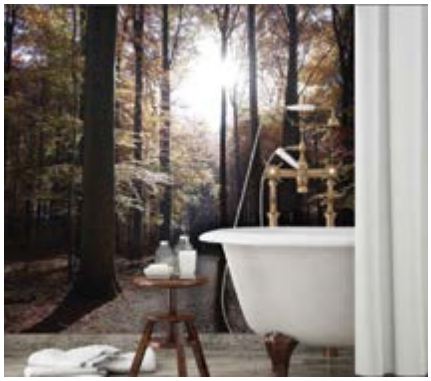
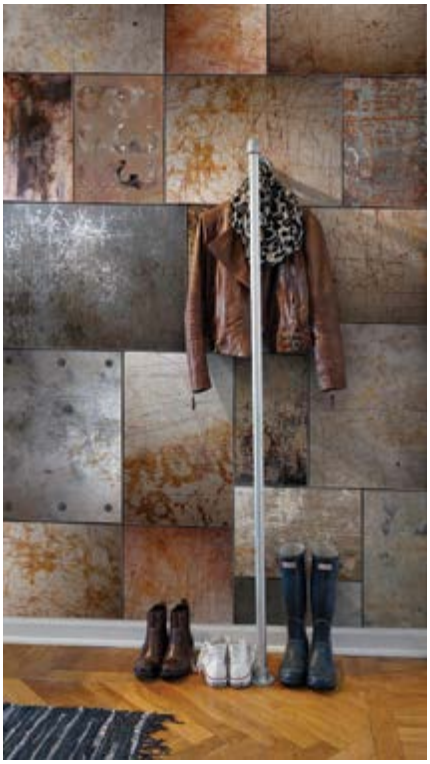


Xeikon's Wall Decoration Suite is ideal for custom illustration and photo murals

Ready to be unrolled and put to use



Striking metallic wall decoration

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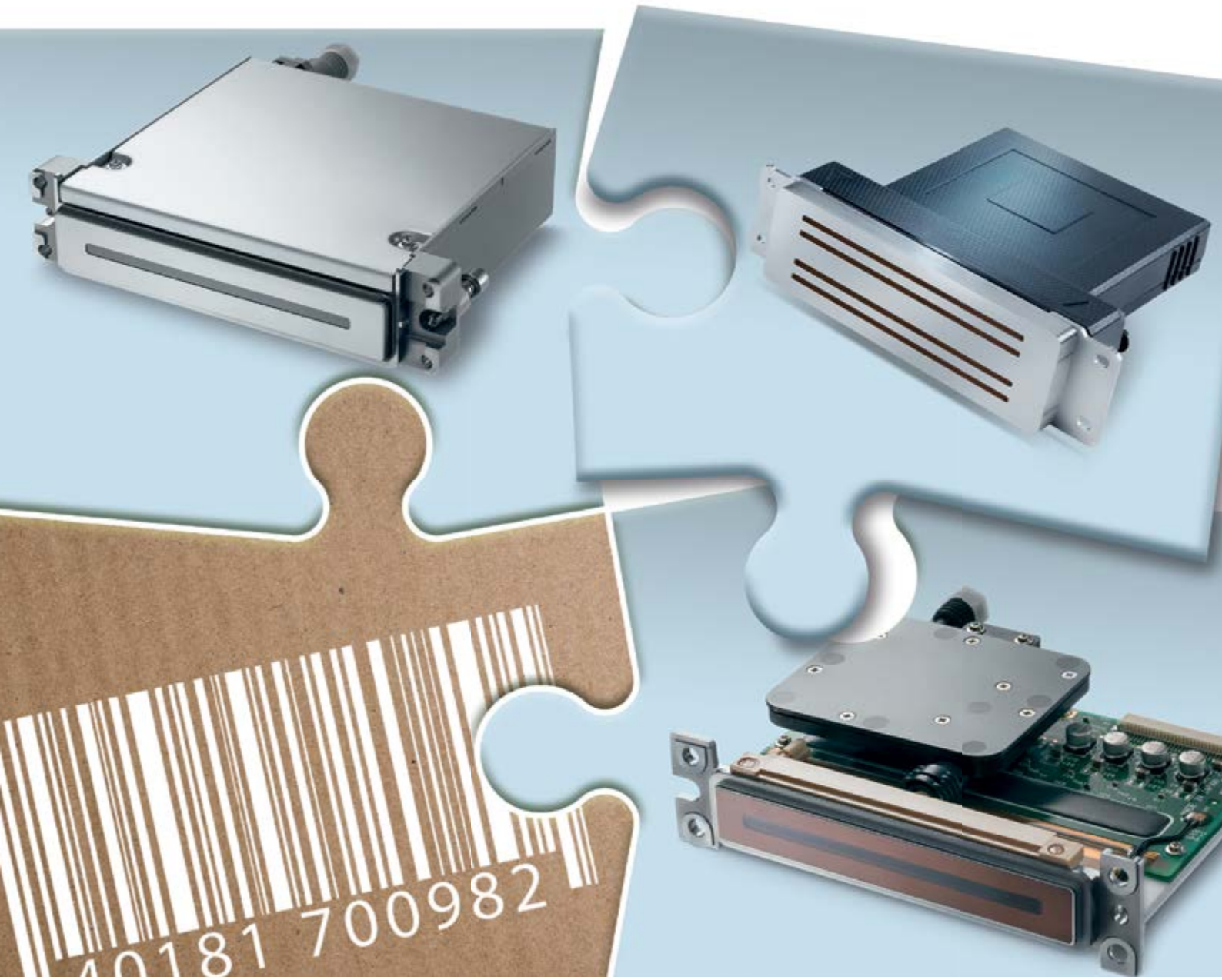

MULTI-DIRECTIONAL PRINTING

OUR THREE PRINT HEAD SERIES ARE ABLE TO OFFER A COMPREHENSIVE SOLUTION FOR A WIDE RANGE OF APPLICATIONS. EXTENSIVELY TESTED **MULTI-DIRECTIONAL PRINTING WITH VARIOUS VISCOUS FLUIDS EVEN WITH HIGH PIGMENT LOADING** COVERS THE REQUIREMENT OF THE LABELING AND PACKAGING INDUSTRY COMPLETELY.

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requirements, the centrepiece of this Wall Decoration Suite is the fast Xeikon 3500 simplex press. It offers true 1200dpi resolution with four-bit variable-dot density print, matching imaging width of 508mm wide, five-colour printing speed of 19.2m/min and high-definition images and smooth tone transitions on a wide range of substrates.

The duplex Xeikon 8500 and 9000 Series presses offer additional flexibility. They can print single-sided wall coverings but also double-sided sample books or any other printing application, for operations looking for a way to diversify.

As every press endlessly prints full-rotary, they are perfectly suited to produce any kind of wall-covering application from short run wallpapers at standard lengths to murals.

Xeikon's Wall Decoration Suite comes with the X-800 digital front-end. Combining prepress functionalities, data processing, colour management and press operation provides a complete production workflow solution, but it can also be seamlessly connected with any market-leading pdf, design and production workflows. It comes with prepress software that allows for automated tiling – perfect for easy wallpaper printing. Completing the process of producing impeccably finished wallpaper decoration is Xeikon's web cleaning unit, a web varnishing module for durable results, and a coreless wallpaper rewinder. They have all been developed to allow manufacturers to print and finish in one go.

BEST BUSINESS MATCH

Before making any decision, operations should consider whether inkjet or electrophotographic printing is the best match for their business. The main ink types used in multipass systems for wall decoration are water-based, eco-solvent, latex and UV. The inkjet printing process essentially comes down to printheads ejecting droplets of ink of different colours directly onto the substrate to form the desired image.

The two main inkjet technologies are continuous inkjet, which forms the image by deflecting selected drops from a continuous flow of ink, and drop-on-demand (DOD) inkjet, which produces ink drops as needed to construct the image. Depending on the technology used to eject the ink, DOD inkjet is further divided into thermal (e.g. latex printing) and piezoelectric systems (e.g. UV printing). DOD is currently the dominant digital technology for wallpaper and in most cases is built into multi-pass platforms such as large format printers.

One challenge inherent to DOD technology is the fact that the printheads can get clogged or misfire, compromising print quality. Other challenges include 'banding' in multipass systems, which results in disturbing lines on the print.

Xeikon's electrophotographic (EP) printers apply electrostatic charge and heat to dry toner and the substrate. As a result, the toner gets fused to the paper. This type of digital technology emits no VOCs and is unmatched in terms of quality and speed, printing up to 900m² per hour.

Xeikon dry toners are developed in-house and are eco-friendly. Containing no solvents or hazardous substances, prints are odourless and safe to dispose of. The toners comply with the European Standard EN 15102, an international safety standard for wall coverings in public places, in terms of reaction to fire, release of formaldehyde, vinyl chloride monomer or heavy metals, sound absorption and thermal resistance. They are lightfast, too, scoring between 6 and 8 on the Blue Wool Scale.

Xeikon is helping to make personalised wallpaper more accessible and affordable

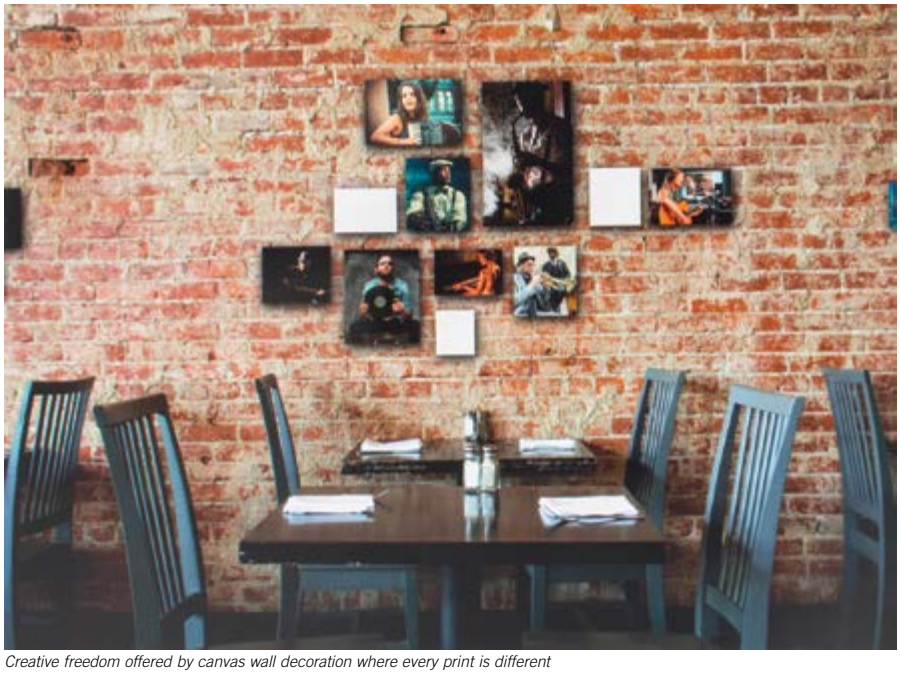
WORKING WITH NON-WOVEN

Crucial, too, is substrate choice. Whether using Xeikon 3000 or 9000 series presses, operations will be able to work with a wide range of substrates that don't need pre-treatment. This includes non-woven wallpaper which is an innovative mixture of synthetic and natural fibres. The fibres are combined with binders, reinforced with acrylates and usually blended with extra pigments to ensure opacity. Ever since non-woven wallpaper was first introduced about a decade ago, it has done nothing but gain market share. Sales have more than doubled since 2007, while regular paper sales are down 43%.

Non-woven is fast becoming every interior designer and wallpaper printer's preferred substrate because it is breathable (ensuring there is no problem with mould), washable and tear resistant for greater durability and easy to apply and remove. It is also perfect for digital wallpaper printing as it remains stable both in dry and humid conditions and, when combined with a Xeikon printing solution, is compatible with a unique kind of dry toner that emits no VOCs and is even FDA-approved.

FUTURE GROWTH

The global consumption of wallpaper in rolls is 752 billion per annum and just 3% of this is produced digitally. In 2017 digital wallpaper printers saw their output grow by a whopping 18% and this trend is set to continue, thanks to growing confidence in order placement, completion and delivery, driven by streamlined processing and high-quality results. ■


Creative freedom offered by canvas wall decoration where every print is different

Dimitri Van Gaever is Business Development Manager for the Graphic Arts Segment at Xeikon

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PUSHING THE LIMITS

Gerard Rich shows how new technology is meeting the challenges of CTS imaging

Screen printing is the process of choice for a set of industrial printing applications. Customers keep on pushing companies to the limits of rotary and flatbed screen imaging with CTS (or CTP) devices.

Lüscher has analysed the challenges of CTS imaging R&D and this, together with customer tests made in our technical centre over the years and with the practical limits in imaging encountered, have led us to develop the X!Tend software package fully integrated in the Lüscher UV imaging system to measurably boost performance.

THICK FILM SCREEN APPLICATIONS

A previous article for *Specialist Printing Worldwide* focused on improved imaging of very fine graphics. The focus of this article is thick film screen applications. Examples are screens for applications in relief coating, Braille characters, solder paste, gaskets or conductive paste.

For transfer, via screen printing, of thick layers of paste or ink on substrates, the trade-off between high EOM values and high resolution of screen imaging is difficult to reach.

For these thick film screen applications we will demonstrate how X!Tend is a tool that enables users to push the limits of screen

BASICS ABOUT LÜSCHER UV LASER IMAGING

Lüscher introduced UV laser imaging in 2007 for a whole range of applications. It immediately replaced lamp-based systems due to better performance and stability.

The Lüscher system is based on individual laser diodes controlled by digital data scanning the surface of screens to directly harden the emulsion.

The laser diodes are coupled individually to optical fibres carrying the energy to the raster plate and the optic.

The laser light of the whole set of diodes is collected on the raster plate at the entry focal plane of the optic and focused by the optic onto the screen surface.

The diameter of the fibres, the design of the raster plate and the design of the optic determine the resolution of the CTS system with a broad range of possibilities from 600 to 10000dpi and beyond.

The laser light is highly collimated and penetrates straight into the material leading to sharp accurate imaging results with no possibility of undercutting.

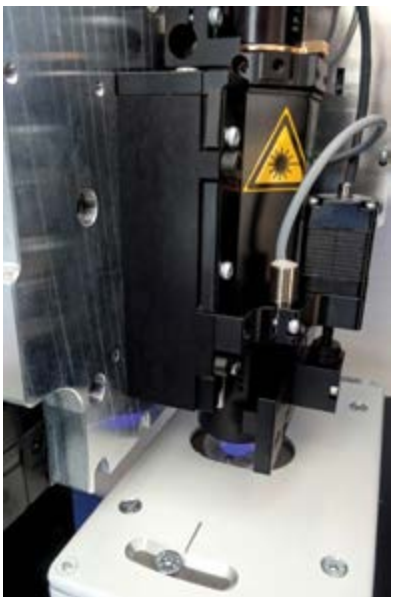
Lasers are permanently controlled for power and the process control is total with no deviations possible.

The digital input of MultiDX! is a one bit TIF file. When the pixel is on locally, the laser is on and the emulsion will be cross-linked.

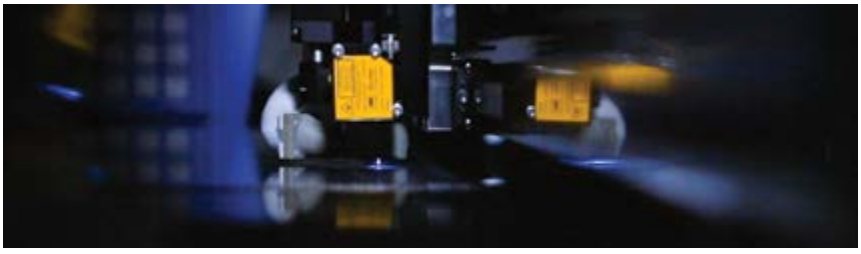
Lüscher has already sold in excess of 150 Flatbed MultiDX! Systems with a large portion of them imaging UV sensitive emulsions, resists or films. ■

UV laser diode with fibre coupled

An electronic module controlling lasers, laser fibre bundle and optic.



Complete mounted optic assembly with laser measurement box and focus system



Boxout 1: About Lüscher UV laser imaging

printing with quantifiable improvements of imaging.

The basics of the Lüscher imaging system are presented presented opposite in: 'About Lüscher UV laser imaging'.

In the next section, we explain first in detail the challenges of thick emulsions and capillary films preparation. We will use the expression 'thick film' to signify a capillary film or an emulsion coated in multiple passes to build high thickness or EOM. The analysis encompasses flatbed and rotary screen printing. The demonstration in this paper, and unless specified otherwise, is based on the example of a well-known capillary film of 100-micron thickness laminated onto white Polyester of mesh 43. The measured fabric thickness is of 115 microns and the EOM is of 95 microns. Tests on different types of capillary films (brand and thickness) lead to results that will be somewhat different but totally aligned in terms of analysis and trends.

Challenges of thick film imaging in direct laser imaging of screen print forms

Challenge 1: Light scattering and diffuse reflection. The first and main challenge is related to light scattering and diffuse reflection effects in imaging. These effects become ever more critical as the

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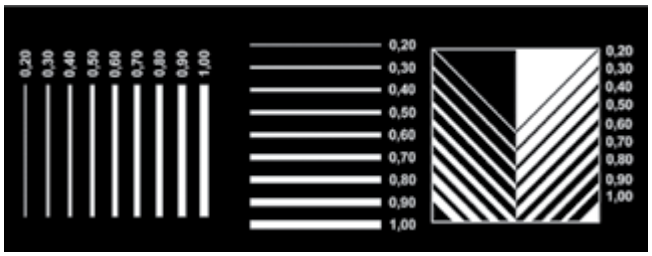


Figure 1: Specific test file used in imaging tests

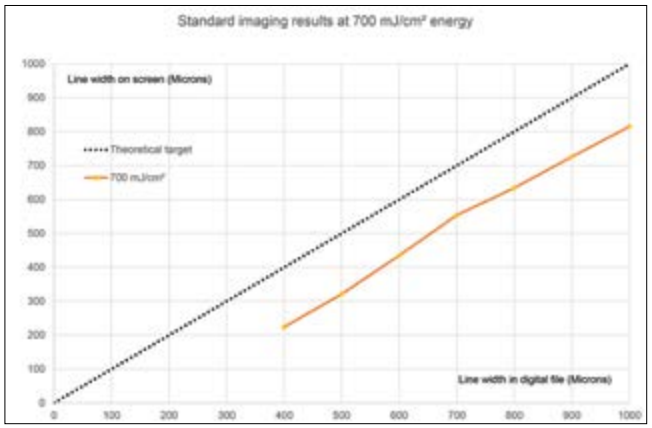


Figure 2: Results of standard imaging of the 100-micron capillary film at optimal level of energy on 43 mesh white polyester

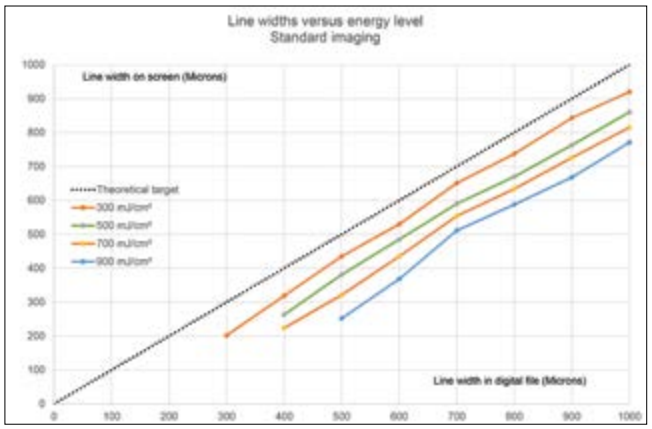


Figure 3: Line widths as a function of energy dispensed with standard laser imaging for the 100-micron capillary film on 43 mesh white polyester

thickness of the thick film to be imaged gets higher. A significant fraction of screens is still imaged with argentic films in a two steps process. The argentic film is imaged with a negative process and is used to subsequently image the screen under a UV light frame. The difference with the CTS positive direct imaging needs to be explained first. The argentic film, the emulsion (or thick film), as well as the mesh, are scattering light during imaging and the results will be different from CTS. In direct digital imaging, the UV laser light is penetrating straight into the thick film whereas, under a light frame, light comes from different angles. However, laser light is scattered as well inside the polymer layer. Its transparency is not perfect as it would be the case for pure glass.

There is of course, in addition, considerable diffuse reflection of laser light at the interface between the thick film and the mesh. This phenomenon is influenced greatly by the mesh type (white or yellow PET or metal mesh) and is always a contributing factor.

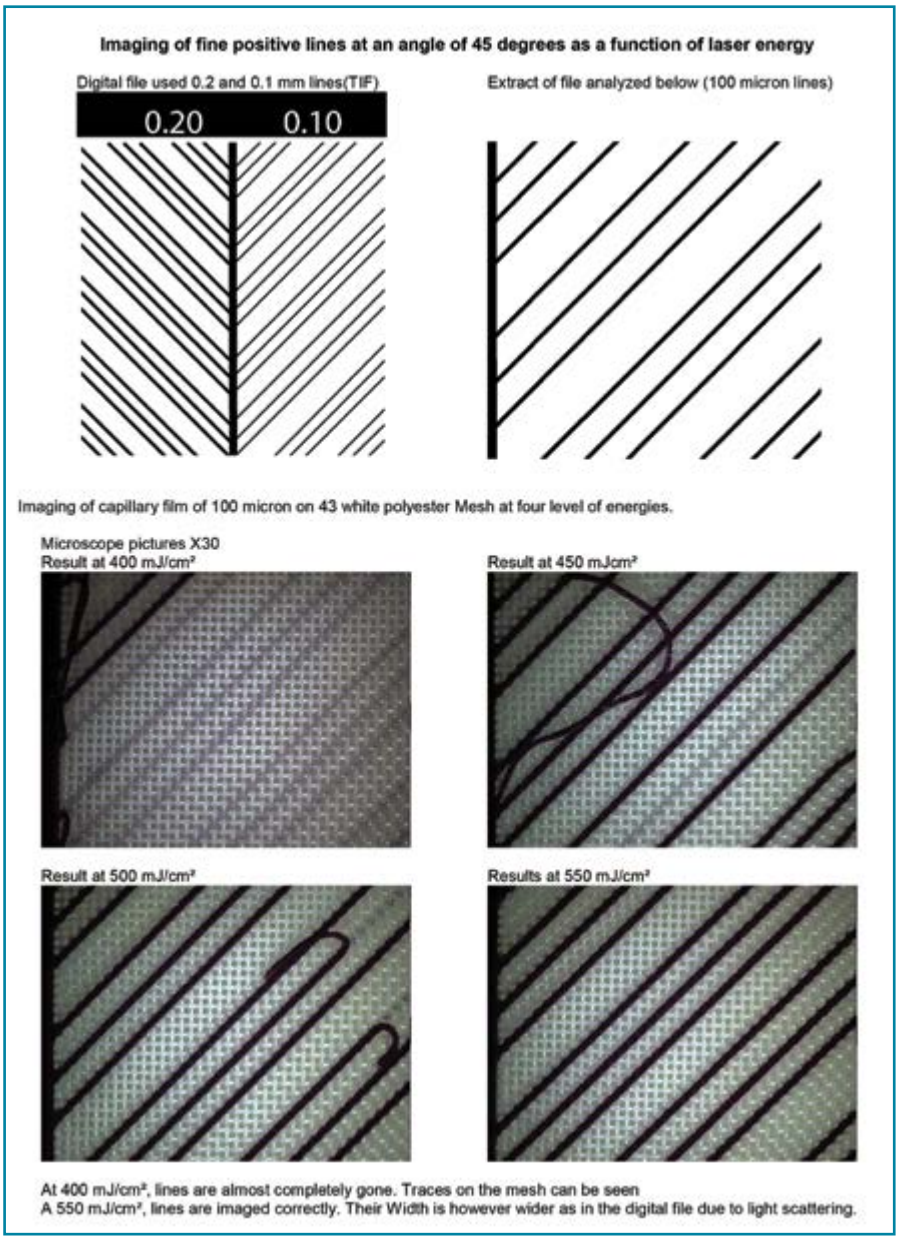
The dramatic impact of light scattering in thick film direct laser imaging will be detailed hereafter. In order to quantify these effects, we designed a specialised test form to measure lines imaged on thick film screens. The TIF file used is reproduced in **figure 1**. The unit used is millimetres.

Basically, we image line widths from 200 microns (0.2 mm) up to 1 mm in steps of 100 microns in several directions in the plane of imaging. Line sizes are easy to measure as imaged on the screen and this is why they are used here. Obviously, the analysis can be transposed to all graphical elements of similar sizes in the particular direction of observation. Theoretically, the thick film line present on the screen after imaging and development should be corresponding to the line size in the TIF file.

Standard laser imaging of the 100-micron capillary film with an energy level which is up to expectations (See below for more on this) leads to results summarised in **figure 2**. The horizontal axis represents the line width in the digital file. The vertical axis is showing the actual line width measured on the finished screen using a microscope.

There are two well-known issues to highlight: glaring differences between the line width on the screen and the theoretical line width in the digital file (an average of 200 microns). It is impossible to image lines below 400 microns as they get closed due to light scattering and swelling of the polymer film during the processing. Both factors add to the issue.

As the industry relies a lot on accumulated experience, the limitations we put light on here are ignored, unknown or at least 'unspoken' with adverse consequences for all players. They simply 'live with it'.



Boxout 2: Minimal energy determination – 100-micron capillary film on 43 mesh white polyester

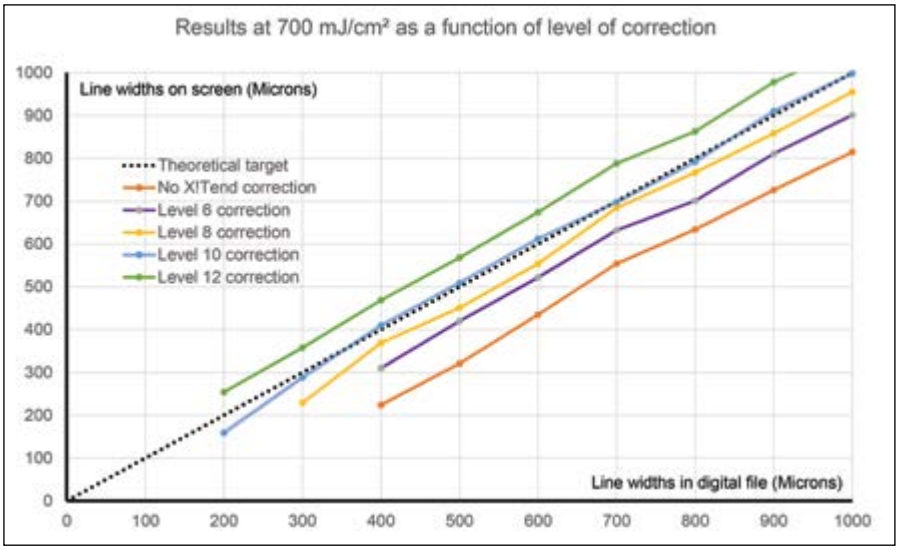


Figure 4: X!Tend imaging results at 700 mJ/cm² as a function of level of correction for the 100-micron capillary film on 43 mesh white polyester

Challenge 2: Securing the bond to the mesh. The second challenge is that there are two chemical processes to be triggered by UV laser light. First, the emulsion has to be crosslinked in order to become insoluble during wash out and, secondly, the bond to the mesh has to be guaranteed for a safe production on press.

In order to achieve a strong bond, due in particular to light absorption in the depth of the emulsion, it may be necessary to increase the level of imaging energy beyond what would be desirable to simply crosslink the emulsion in its thickness. This may limit the imaging performance significantly and, for thick emulsions, often dramatically.

In practical terms, the energy to be dispensed, to get adhesion, is higher than would be desirable to have a nice open screen as seen under a loop on a light table. To make sure that the screen will behave up to expectations with respect to life on press, we need to determine with professional tools the minimum laser energy to dispense. This is done with a specific set of tests.

A dedicated digital file incorporating fine positive lines of 100 microns in this case (the thickness of the film) spaced apart is imaged under increasing levels of energy in small increments. These fine lines configuration is stressing heavily the bond of the emulsion at the mesh interface during wash out. Details are presented in **boxout 2**: 'Imaging of fine positive lines at an angle of 45 degrees as a function of laser energy'.

On top of the box, the specific test file used and a detail of it (lines of 100 microns) is shown.

Below in the box, microscope pictures of the finished screen at 400, 450, 500 and 550 mJ/cm² of laser energy are reproduced (magnification of 30x): up to 400 mJ/cm², all lines are gone. We can see traces of their initial presence on the mesh. At 450 and 500 mJ/cm², lines are partially surviving the process. At 550 mJ/cm² and above, lines are held correctly. However, it should be noted that their width is imaged close to 200 microns at 600 mJ/cm² due to the light scattering effects already discussed.

Continued over

From these results, we can deduce that the rock bottom level of laser energy to be used is 550 mJ/cm². To compensate for fluctuations in the process (operator, temperature and batch to batch variability of film and mesh), we recommend to use in this case 700 mJ/cm² as minimal energy level.

To illustrate what the minimal energy request does to the imaging result, we made standard imaging tests with the digital file of **figure 1** at different energies.

Results are summarised in **figure 3**. What we take from this graph is: negative elements such as lines are correctly imaged at 300 mJ/cm² already (looking at them under a microscope) but we know now that they will not survive in printing. At 700 mJ/cm², the result looks unfavourable if compared to 300 mJ/cm². However, using 300 mJ/cm² in production would lead to a disaster on press. This is a cognitive trap to avoid.

Challenge 3: Light energy distribution in the depth of the film. The third challenge is that, because most emulsions pre-existed recent CTS laser systems, the UV laser light absorption in the thickness of emulsions, at the laser wavelength, may be too high to get the job done easily. This requires sophisticated CTP imaging strategies whose discussion is beyond the scope of this article.

These three challenges have been addressed successfully by the Lüscher Technologies' R&D with three technologies unique in this field:

- High resolution imaging
- X!Tend software
- Specialised imaging strategies

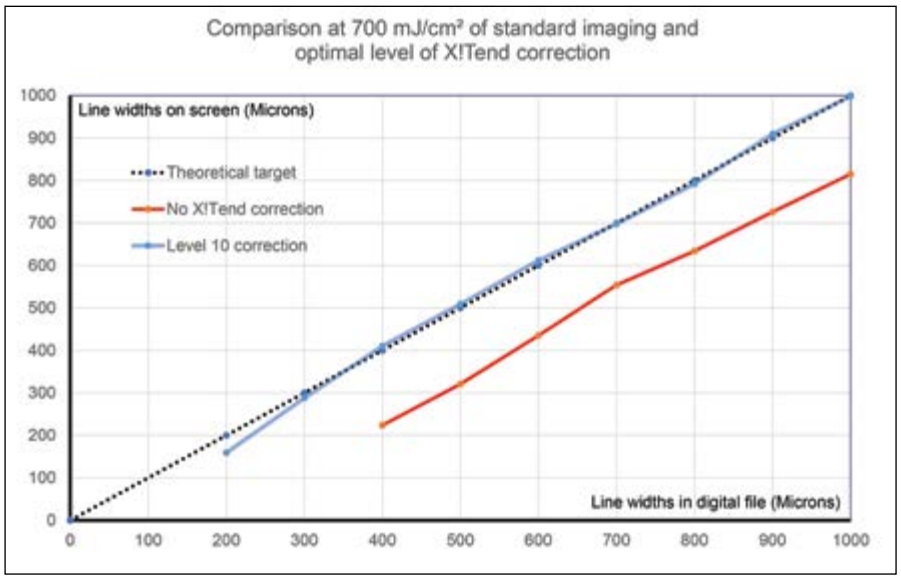


Figure 5: X!Tend imaging results at 700 mJ/cm² under optimal correction for the 100-micron capillary film on 43 mesh white polyester

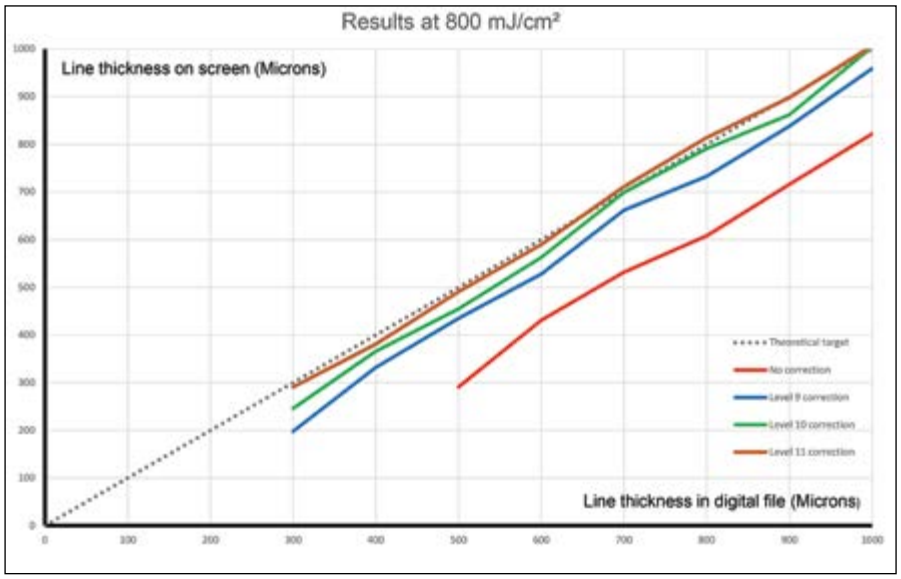


Figure 6: X!Tend imaging results at 800 mJ/cm² as a function of level of correction for the 100-micron capillary film on 43 mesh white polyester

X!TEND SOFTWARE

The X!Tend software is designed to extend the range of imaging capability of any emulsion or capillary film and to increase the fidelity of digital data reproduction on screen. In addition, the X!Tend software widens the window of imaging energy applicable to any emulsion. More laser energy without loss of imaging quality will make the screen more robust and more durable on press.

The corresponding software parameters are stored into templates for maximum comfort in production and can be selected, or not, specifically for types of jobs and the range of emulsions used in production. The software is resolution independent. With higher resolution however, the benefits of more accurate definition of graphics will remain intact.

The X!Tend software uses standard TIF input. There is no need for changes in the prepress department. The desired effects are obtained by simple user specific settings. The selection of settings is based on standard CTS imaging results where deviations between the input file and the result on screens can be measured. It is a kind of 'fingerprint' for stencil making. There are rules of thumb that can be called on as well.

The TIF input is manipulated 'on the fly' during imaging without any loss in imaging speed.

While it is desirable to adapt small negative graphical elements as demonstrated here, it is mandatory not to affect adversely small positive elements (such as shadows and positive fine lines) that need to be imaged properly. They will print negative for screen applications.

The results shown here for graphic and related industrial applications can be transposed for all other applications involving photoresists or dry films.

X!Tend does the job professionally, completely, automatically and for all graphical elements (including raster zones) at any scale.

IMAGING RESULTS OBTAINED WITH THE X!TEND SOFTWARE ACTIVATED

Using the test file in **figure 1**, we imaged the screen with different levels of X!Tend correction at pre-set levels of energy. Results are summarised in **figure 4** at an imaging energy level of 700 mJ/cm²: as you can see from the graph, the actual line width increases steadily with increase of the level of correction and finer lines can be imaged. For standard imaging, lines below 400 microns are closed whereas at correction levels of 10 and 12, 200 microns lines are imaged correctly.

We select correction level 10 as optimal at 700 mJ/cm². See **figure 5**: the line widths imaged correspond to the widths in the digital file with good accuracy. The standard deviation is of 10 microns and the average value difference, within the whole set of data,

Continued over

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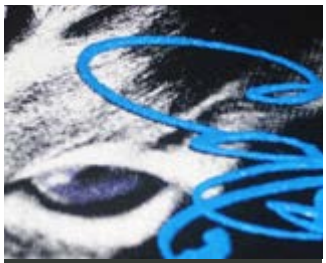

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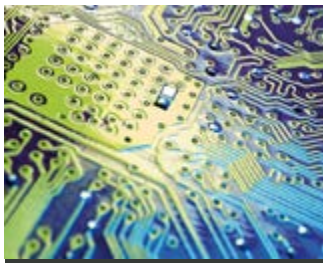
HABITAT



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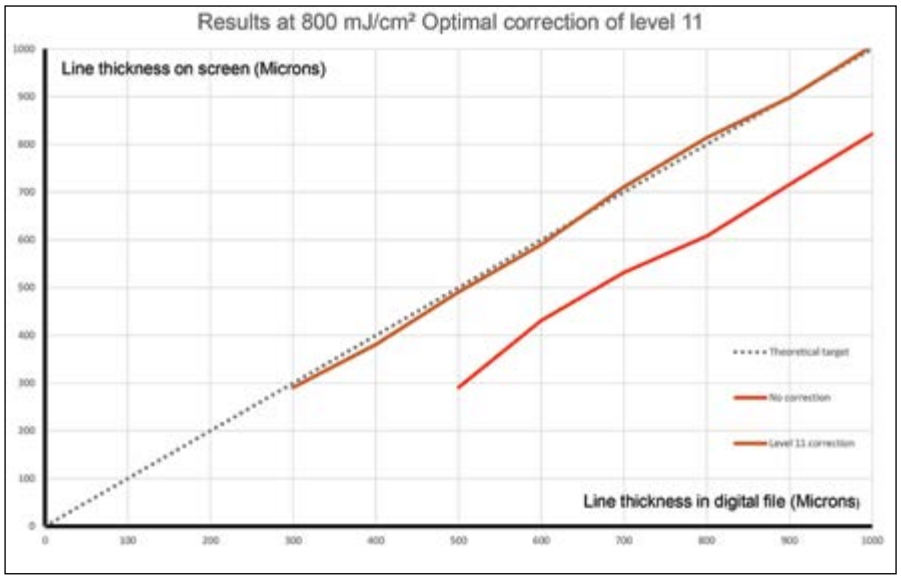


Figure 7: X!Tend imaging results at 800 mJ/cm² under optimal correction for the 100-micron capillary film on 43 mesh white polyester

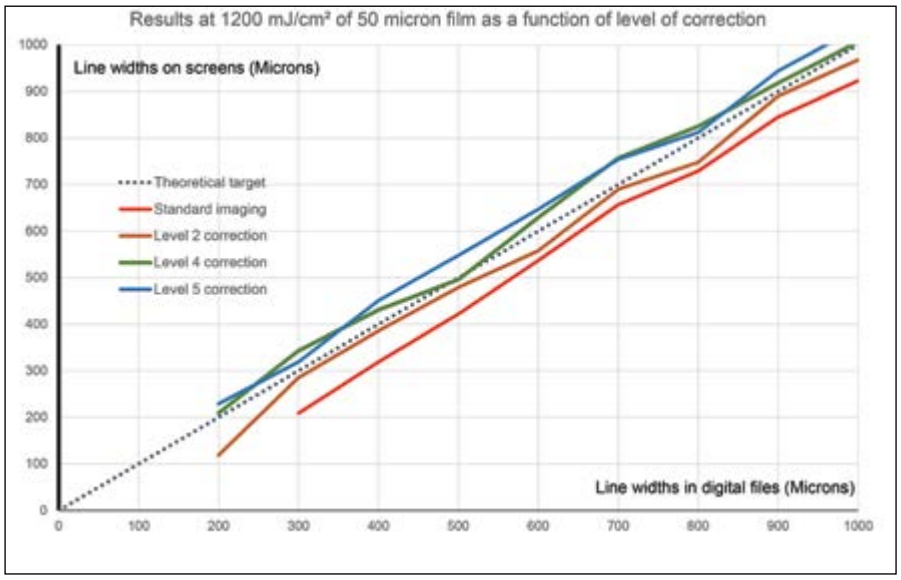


Figure 8: X!Tend imaging results at 1200 mJ/cm² as a function of level of correction for the 50-micron capillary film on 43 mesh white polyester

is within three microns of the target. Lines of 200 microns can be imaged whereas 400 microns is the lower limit under standard imaging conditions. The extension of the printing range and the improvement of fidelity of imaging to the digital data are obvious.

If need be, we can increase the level of imaging energy to 800 mJ/cm² and increase the X!Tend compensation. See **figure 6**.

At this level of energy, Level 11 correction is optimal (**figure 7**).

Please note that lines of 200 microns are no longer open at this correction; 800 mJ/cm² is, however, perfectly okay if the graphic to be printed is compatible with this added limitation in graphical elements size.

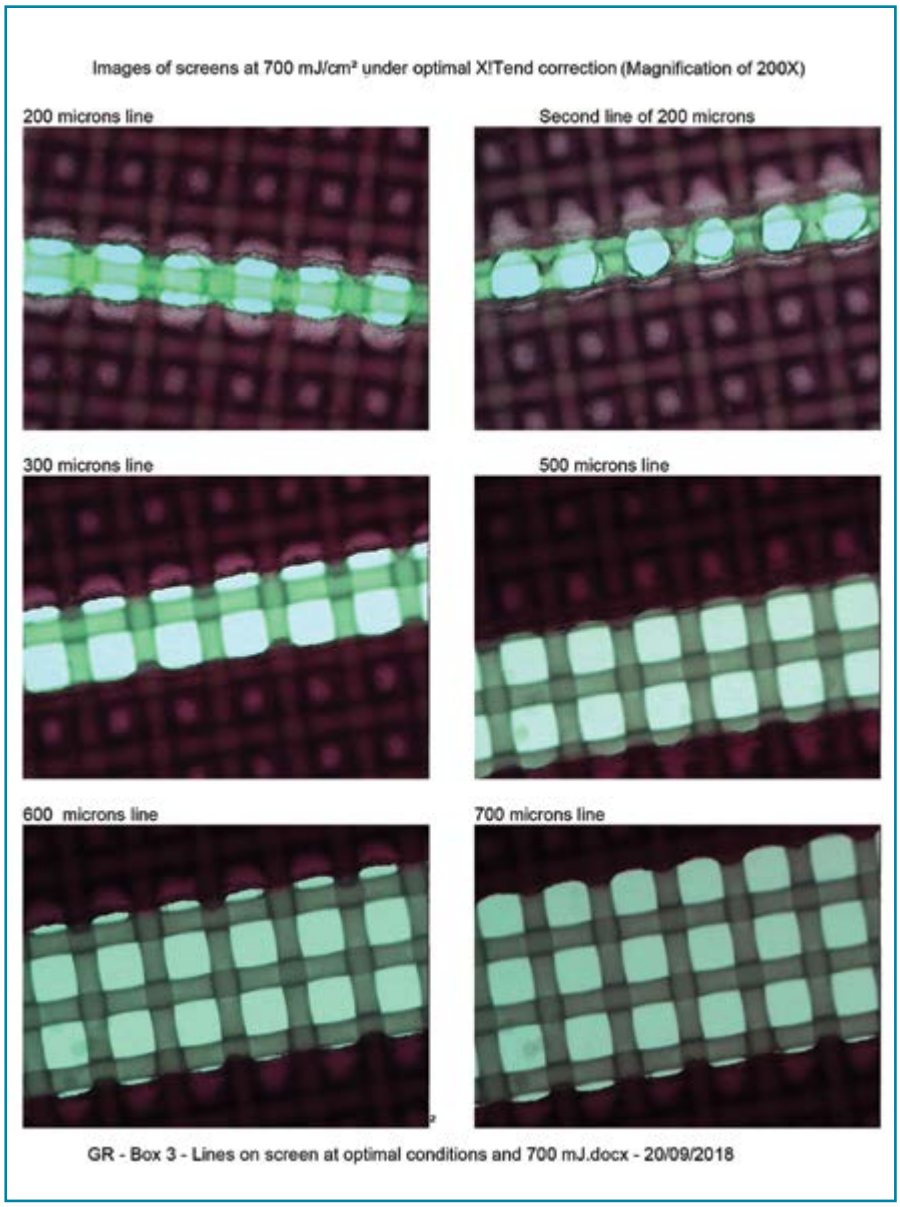
COMPLEMENTARY RESULTS

We have proven that our results are consistent over time and can be used for production purposes. Screen preparation has many manual steps not necessarily always well controlled.

Tests presented above have been duplicated with two batches of film from the supplier, two batches of film applications on screens and two imaging, followed by wash out, campaigns separated by months. All test results overlap well.

We should consider anyway the perturbation in results created by the mesh itself.

For this, see **boxout 3:** 'Images of screens at 700 mJ/cm² under optimal X!Tend correction (magnification of 200X)'. Two different 200 microns lines (on top of the box) are reproduced side by side. The line on the left has a yarn in the middle of it and will print very differently. This is inherent to Screen printing. With the mesh used here, 300 microns (lines or corresponding sizes of other graphical elements) is a reasonable lower limit to consider.



Boxout 3: Complementary results – microscope view at optimal X!Tend correction at 700 mJ/cm² for the 100-micron capillary film on 43 mesh white polyester

The results here can be transposed to different film thicknesses and types. Complementary tests with a 50-micron capillary film from a different brand, mounted on the same mesh, lead to somewhat different results. First of all, this film needs much more energy to get imaged correctly. The film needs a lower level of correction as light scattering is significantly lower for this material. These two parameters are most likely correlated by the specifics of the film chemistry.

Figure 8 shows X!Tend results at 1200 mJ/cm² for this 50-micron film. A level 3 X!Tend correction will do the job here.

CONCLUSION

The X!Tend software, completely integrated into the Lüscher imaging system, is a user-friendly professional tool enabling to radically improve the imaging of thick capillary films and emulsions. It is open in design with user defined settings totally integrated in the output computer and software of Lüscher CTS devices. The fidelity of reproduction of graphics is restored and finer graphics become possible to use in production. Last but not least, optimum imaging quality is made compatible with high life on press. It is qualified for a wide range of emulsions and capillary films. It is applicable as well for negative or positive photoresist applications of any type with all desired imaging resolutions. ■

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BEST FOR BRANDING

Don Copeland looks at the advantages of adding a UV-LED printer to your business

The graphics marketplace continues to grow with more and more demand for custom printed items. Ranging from business cards and forms, to apparel, to signage, to packaging, to advertising specialty items, the list of items that require branding is seemingly endless.

The difficult decision is, what type of printing equipment should you add to your business to address these needs? You could add large format for signage if you don't already do that. Or, you could consider traditional screen printing for apparel, but that can be space consuming and messy, and it is a pretty saturated marketplace with little room for a neophyte to jump in and make good profits. So what about adding a piece of equipment that could print full-colour small to mid-size indoor and outdoor signage, PVC materials like ID cards and ad specialties, prototype and private label packaging as well as printing directly to pre-assembled items?

The Compress iUV-600s flatbed printer

THE SOLUTION

Small to mid-format UV-LED printers can address these needs and more. With the ability to print on a wide range of substrates from wood to plastics to metals and even glass, UV-LED presses open up a lot more options for printing (especially 'direct-to') than any other form of digital printing. Add to this the ability to print on items that are already assembled (typical small to mid-format UV-LED printers print at least six inches in depth, with others up to almost a foot in depth and specialty machines even up to 18 inches) and it is hard to argue with the versatility of these machines.

A UV-printed toilet seat

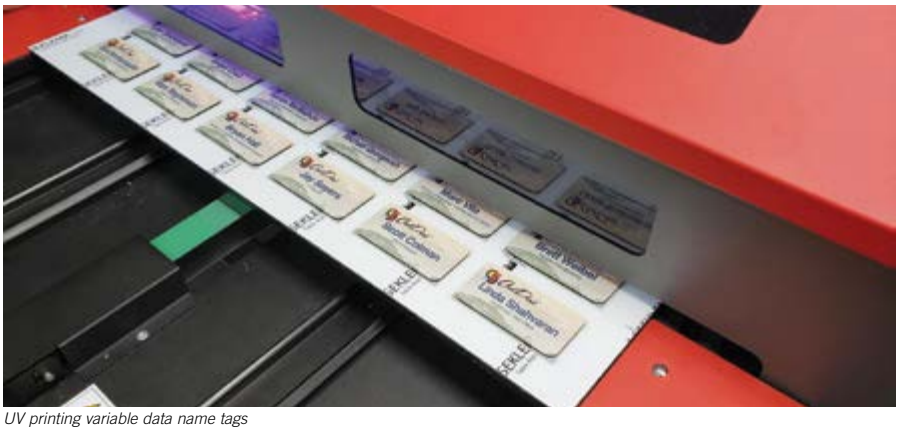
ADVANTAGES OF UV-LED

There are some distinct advantages to UV-LED printers that are not found in most other digital presses. Most analogue versus digital solutions are typically a trade-off of consumable costs versus speed versus special handling or material specifications. With UV-LED printing these considerations are minimal. Virtually every metal or plastic that is direct printed through an analogue process requires the same or similar surface treatment processes as does the digital process.

COMPARISONS

The more colours to be printed, the more the scales tip towards digital being a better solution; with UV-LED this is very much the case, especially when compared to pad printing. Because of the nature of the pad printing process there are minimal amounts of ink required in each inkcup (reservoir holding the ink) in order for the etching on the cliché (printing plate) to properly receive the ink; too little and the etching will not fill properly, resulting in an undesirable impression. The amount of ink needed varies based on the size of the inkcup but it is not trivial and can lead to waste that must be accounted for.

The number of colours increases for pad printing; and film, plate and ink costs increase, as do print times. A single colour job will take at least 30 minutes to set up and a semi-automatic machine might do 1000 impressions an hour for one colour, and multi-colour prints max out at around 600 impressions an hour (with added setup time



UV printing variable data name tags

UV printing on cylindrical and conical items using the Compress iUV-600s

for each colour). For small items like golf balls, thumb drives, or other specialty items, it is not uncommon for a UV-LED printer to handle 70–120 items at a time and print a full bed in 5–10 minutes (or 500–1000 pieces per hour) regardless of the number of colours.

Screen printing on flat items also involves many of the same shortcomings. Setup costs and time are similar to pad printing per colour, while ink costs are a little lower. Still, on jobs of more than a colour or two and orders less than 1000 it is often more economical to print using a UV-LED printer than to screen print.

One final thing to consider when thinking about adding either pad printing or screen printing (or both) instead of a UV-LED printer is the fact that digital printing allows for unlimited variability in colours, size, fonts, data, numbering, etc. With a good software package backing it up, a small to mid-format UV-LED printer can just as quickly print 600 unique pieces of artwork, incorporating different wording, colours, even graphics – as quickly as it can print 600 of the same design. Changes like these could add hours of set-up and multiply materials costs through the ceiling when done via pad or screen printing.

So, when the time comes to consider adding new equipment to your printing business, take a look at digital UV-LED printers. A flatbed model like the Compress iUV-600s or 1200s can offer a lot of versatility to a print operation, and presses can also be outfitted with rotary attachments to do cylindrical and conical items. I think you will be surprised at how much UV-LED printers can do and how profitable they can be. ■

The Compress iUV-600s printing logos on golf balls

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UV BUT NOT AS YOU KNOW IT

Simon Mitchell comments on the debate over the latest, lower energy options and how he sees the market evolving

Simon Mitchell, Joint Managing Director of IST

UV is a well-known and well accepted drying technology. It produces dry, aesthetically pleasing print and, given that it eliminates the need for spray powder, it has the added benefit of creating a clean pressroom. So why if it is so great and so widely used is there suddenly such a frenzy around the potential of LED-UV and LE-UV? It all comes down to energy usage and, with that, the costs and environmental impacts.

UV uses lamps, LE-UV uses 'doped' lamps reducing the energy but compromising the curing range and LED-UV moves away from lamps completely to Light Emitting Diodes and that is the lowest energy option of all. The counterbalance is that the ink costs are the direct reverse, highest for LED-UV and lowest for UV.

MAKING THE RIGHT DECISION

"The winner of the UV versus LED-UV debate will depend to a great extent on the relative cost of inks and energy in each market," says Simon Mitchell, joint managing director of IST (UK). "We believe that LED-based technology and the elimination of lamps is the future because of the reduced energy costs and lower CO_2 emissions. But there is a reticence still which comes down mainly to the increased ink costs. We try to look at each company and its product mix and to give honest advice on the right technology for their application. As we offer all the UV options (and even a retrofit service) and are not tied in to any ink manufacturer we can be entirely objective."

LE-UV has caught on in commercial print because it has a relatively low cost of entry and dry sheets off the end of the press allow printers needing to offer a rapid response service (not least web to print players) to process work and deliver it more quickly. The quicker throughput, elimination of spray powder and aesthetic lift more than balance the lift in ink prices over conventional litho products for many. Heidelberg alone has at least a dozen LE-UV customers in the UK.

LED TO LOWER PRICES

But there is now gathering momentum for an LED-UV future and this has a much broader appeal across packaging, labels and commercial print sectors. In October the British Coatings Federation hosted two events in Edinburgh and Sutton Coldfield to address the issue: *Throwing Light on UV LED Curing*.

IST's LEDcure eliminates up to 60% of the energy of a traditional UV system. There is no warming up or cooling time; it is simply on or off. Furthermore it focuses its cure on the print itself, laterally and vertically, so minimises waste energy. Combined with the IST XL8 booster it has up to 30% higher output than conventional LED systems.

"We believe that as LED volumes increase,

DEFINITIONS

UV: Ultra Violet, a well established method for curing ink. Whereas conventional inks dry by the absorption, evaporation and oxidisation, UV uses a chemical process in which the ink reacts with the UV light to polymerise the liquid into a solid. It is widely used in packaging and also in some commercial printers.

LED: Light Emitting Diodes are used rather than lamps and they use one wavelength of 385nm. They use less energy than either UV or LE-UV lamps.

LE-UV: LE stands for Low Energy. The lamps are doped so that short waves are not emitted and curing occurs at 290–400nm, with main peaks at 313nm and 365nm.

Photoinitiators: The various UV technologies require different inks to the conventional printing process. Each will require inks with photoinitiators which are turned into free radicals on exposure to UV light creating the 'cure', dried ink or varnish. The cocktail of photoinitiators will vary between the different types of UV process. UV, LED-UV and LE-UV inks are more expensive than conventional inks but less ink is needed (sometimes only 50%) and, as volumes increase, prices are expected to reduce.


HotSwap allows users to run both UV and LED-UV on one press

IST's LEDcure eliminates up to 60% of the energy of a traditional UV system

ink prices will come down," says Mr Mitchell. "It is the narrower curing range (350–420nm and 385nm as standard with LEDcure) that restricts the type of photoinitiators that can be used. LEDcure systems can be specified on a new press or retrofitted quickly and easily at the print factory on an existing press. The anticipated life of a LEDcure system is 20,000 hours but individual arrays rather than whole units can be replaced so investment is really quite low risk."

HOTSWAP

IST likens the UV debate to that of petrol, diesel or electric in the car industry. Everyone knows the electric car is the best long term solution but many would-be buyers remain cautious about taking that step forward. The car industry's answer is the hybrid and that is exactly what IST has emulated with its Hot Swap system.

HotSwap allows users to run both UV and LED-UV on one press, using interchangeable cartridges but a common housing. The housing, cooling and electrical supply for both systems have been matched for the IST METZ Hot Swap concept.

IST's HotSwap system was short-listed in the Stationers' Company Innovation Excellence Awards and the British Coatings Federation Awards in 2017 and this year won the title of Global Market Leader 2018 in the Mechanical and Systems Engineering sector for UV drying systems based on UV, IR and Warm Air from the University of St Gallen. ■

Simon Mitchell is Joint Managing Director of IST

The IST METZ building at the company's headquarters in Nürtingen, Germany

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TAKING THE CURE

Jennifer Heathcote examines the growing role of UV LED curing in food-safe printing

From the perspective of food packaging, food safety means that the constructions, inks, coatings, adhesives and other materials used to decorate and convert the final barrier assembly are safe for consumption. All the respective manufacturing and material handling processes employed must not compromise the integrity of the packaged food item such that as long as the food is processed and packaged correctly, it remains safe for consumption over the intended product shelf-life.

UV LED FOR FOOD SAFETY

Ultimately, it is up to the converter and food packager to ensure that the materials and processes used for each food packaging job are in compliance with established regulatory guidelines. Advancements in UV LED curing include greater UV output, more efficient conversion of electricity to UV, longer system life, and a greater and more powerful range of products designed with air-cooling. Regardless of the curing device (UV LED or otherwise), it is up to the converter to ultimately ensure that the formulations are properly cured.

UV LED has the advantage over conventional mercury systems in that it offers repeatable and consistent output across each production shift of each day throughout the year. Since degradation in UV LED output occurs slowly, UV LED curing provides superior process control and confidence that the system is continuously delivering the same UV energy over time to properly cure the formulations. Food grade inks must be formulated with industry approved food grade ingredients. In production, the inks must be exposed to sufficient UV output (wavelength, irradiance, and energy density) in order to properly cross-link the components and provide acceptable adhesion and surface cure. This minimises the level of uncured materials that can migrate through the barrier constructions and reach the food.

Phoseon's FireJet FJ601 air-cooled UV LED flexo solution for narrow web retrofit

THE CURING PROCESS

UV curing is a photopolymerisation process that uses UV energy to change a mixture of non-crosslinked solids into a crosslinked solid. Upon absorption of the UV energy, photoinitiators produce free radicals that initiate cross-linking with monomers and oligomers in a reaction that cures or solidifies

Continued over

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the ink, coating, or adhesive into a plastic. The process of curing, or photopolymerisation, is the same for both general purpose and food grade inks; however, food grade formulations have greater restrictions on the ingredients that can be used as well as the levels of non-cured residuals that can be present following cure. This means that food grade formulations require additional and more frequent quality checks and inspections. Food grade formulations also tend to use ingredients with larger molecules that are less likely to migrate through the construction walls.

Converters should work with industry suppliers to first ensure that the UV LED system is matched to the needs of the press, the intended formulations, and the constructions. They should understand what quality checks should be implemented and ensure that formulations and constructions are converted before the end of their specified life. Finally, periodically inspect the UV LED system to confirm that it is indeed functioning properly and delivering the specified energy. There are numerous variables in the converting process. Defining and establishing the process window and then operating such that the press is run within that window will help ensure food safe packaging is produced.

COMMON MISTAKES

It is important that packaging converters properly maintain and regularly clean all their equipment with approved food safe materials. Problems occur when converters use formulations or other materials not approved for food packaging or when they have not confirmed that the UV system is properly matched to the formulations and products being produced. Because UV LED curing is relatively new, the market doesn't yet understand the differences in the commercial offerings. The performance of UV LED systems from various suppliers can vary drastically depending on the design and the integrity of the assembly. Inferior UV LED curing systems are going to struggle to provide sufficient cure particularly at faster press speeds and often exhibit shorter life spans compared to better engineered systems.

FOOD SAFETY REGULATION

Food safety regulation and policies vary across regulatory bodies, and converters are often left to figure out implementation and compliance on their own. With current regulatory policy, it is difficult outside of using approved materials to know whether a product is actually compliant. Regulatory bodies tell the industry what is expected or what cannot be used, but no one is providing the converters with guidelines on implementation, cure, and go-no go quality inspections.

Formulators do a great job making sure that food safe formulations are only made with approved ingredients; however, the industry hasn't done a sufficient job of educating converters on how to implement process control and ensure the integrity of the final packaging.

Extraction testing using established global laboratories is commonly used by formulators and converters; but, these tests can be expensive and time consuming and are only indicative of the compliance of the samples sent in for evaluation. The industry must work together to help converters understand what is required of them to be compliant with regulatory policy. Phoseon is also working closely with associations and UV LED formulators and raw material suppliers in an effort to educate the market on the nuances of UV energy delivered by LED sources and how it differs in comparison to that from conventional mercury lamps. As the formulators become more knowledgeable in the mechanics of UV LED output, new more efficient formulations are subsequently developed.

In addition, we become more confident in what the UV LED sources need to deliver across the varying print methods and press configurations. Greater industry collaboration results in better matched solutions that will ultimately drive food safe UV cured packaging. ■

Jennifer Heathcote is the Global Director of Business Development at Phoseon Technology

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HAZARD WARNING

Gabriele Heller highlights the significance of an updated CLP regulation concerning treatment of hazardous mixtures

ESMA
Driving Print Excellence

Gabriele Heller

On March 22, 2017 CLP (Classification, Labelling and Packaging) regulation was amended by adding a new Annex VIII. This annex requires the notification of hazardous mixtures to the 'appointed bodies' nominated by the member states responsible to receive information on these kind of mixtures, enabling them to make an emergency health response. The annex also specifies the information such notifications must contain, thus unifying the content of the notifications for all member states.

The following transition periods for compliance with those new requirements apply:

- Consumer products: 1 January 2020
- Professional products: 1 January 2021
- Industrial products: 1 January 2024

The European Chemicals Agency (ECHA) will provide tools to help industry and appointed bodies to comply with those requirements. The following tools are already published and available:

- Guidance document*
- European Product Categorisation System (EuPCS)**
- Unique Formula Identifier Generator***

NOTIFICATION PORTAL

There is, however, one tool that is expected to be workable before 2019: the notification portal. Submissions are intended to be made by using this portal. It will also enable upload of xml files containing the information required for submission to the appointed bodies. It is intended to make available to the providers of hazardous substances management systems the definition of the xml files so that they can implement a 'submission generation tool' into their software.

The tools provided by ECHA will be free of charge. It is, however, left to the member states [to determine] whether they will require fees for the submissions they receive. ■

Gabriele Heller is Chairman of ESMA's Health, Safety and Environmental Protection Committee and Senior Manager Product Safety at Marabu

***AIM OF THE GUIDANCE – TO PROVIDE INFORMATION ON:**

- The scope of Annex VIII to CLP, i.e. for which type of mixtures the required information has to be submitted
- Who should submit information in accordance with Annex VIII to CLP and by when
- Issues to consider when preparing for a submission of information
- Use of the 'Unique Formula Identifier' (UFI)
- Use of the harmonised European Product Categorisation System (EuPCS);
- Details of the information required to be submitted
- Use of the common XML harmonised reporting format
- What changes or new information trigger the need for an update.

**The notification must contain the product category of the mixture to enable the appointed bodies to do statistic evaluations on poisoning accidents related to certain categories. The system contains the categories of which one has to be chosen for each mixture that is notified.

***The notification must contain a unique formula identifier UFI) for each mixture notified. This is a 16-digit code that is generated from the vat number of the notifying company and the internal formulation number by using a certain algorithm. The generator can be found on ECHA's website. The UFI also has to be printed on the label of the mixture.

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BRIDGING THE TECHNOLOGY GAP

A London showroom and test centre allow this Japanese company to share its expertise with European customers

For over 70 years, Sakurai has provided the international industry with complete technological solutions for screen and offset printing, with the aim of generating considerable added value within the customer's production cycle.

The industrial printing market today is defined by the specific application segments of destination (functional, decorative, packaging) and by how the quality and speed of printing are integrated into the production processes: Sakurai is oriented towards the optimisation of both parameters and offers complete printing systems to give industrial operators excellent levels of performance.

LONDON CALLING

The European market has responded positively to the bold moves Sakurai has made to revolutionise the Japanese company from merely a printing machine manufacturer into a company capable of supplying complete solutions for industries that integrate silk-screen printing into their internal production. To support and develop business within the European industrial market, Sakurai has created a hub in London dedicated to reducing the gap between Japanese technology and European industry and consolidating the role of Sakurai's UK headquarters as a European flagship for Japanese excellence. This process also benefits from the vision of Claudio Moffa, Sakurai's Executive Officer, who has been managing the London branch since 2014, and has generated a 300% increase in the company's segment dedicated to screen printing in the last four years.

The labs in the Print Solution Centre in London are a portal through which European industrial clients have access, with the support of the Sakurai operators, to a world made of advanced specialised solutions generating new business opportunities. Within the London Showroom and Test Centre are examples of complete lines for screen printing that are continuously engaged in demonstration activities, from pre-press to drying, so that the user can have tangible proof and fully understand the processes – from the production of the frame, up to its recovery through the printing phases, handling and storage. Understanding the processes thoroughly means comprehending the enormity of the application's potential, opening up to the customer many potential unexplored business scenarios.

The Maestro MS 102 INS with offline inspection system

The Maestro MS 80 SD is based on Sakurai cylinder technology

The Maestro MF80 V2 Textile Smart

SAKURAI ACADEMY

The aim in the medium term is to create the Sakurai Academy: a hi-tec training school dedicated to the print operators of current and potential customers. The challenge is to create a culture around the commercial potential of screen printing within the European industrial market to generate revenue.

Furthermore, to finalise a sale, the strategic ground within which the negotiation is carried out is the service and not the technological capabilities of the machine: the training of the operators, the quality of the after-sales service provided by the Sakurai teams are tasks that customers want to define item by item. Due to the importance of the after sales service, the London office management decided to invest significant resources in training activities: the Sakurai Academy.

PRODUCT INNOVATION: MF80 V2

The spectrum of possible applications of Sakurai screen printing technology is very wide: the solutions are used for the different finishes of commercial printing such as UV painting; for glitter paints; for the production of credit cards; for the production of the graphic electronic and conductive components of keyboards; for control panels, for example for industrial machinery; for transfer printing involved in the production of technical or sports clothing.

This last sector called the Textile Heat Transfer contains such potential for development that Sakurai has invested heavily in Research & Development and has recently introduced a new specifically dedicated machine: the MF80 V2 Textile Smart flatbed machine.

The fully automatic MF80 V2 is equipped with an OSA (Optical Sheet Alignment) system consisting of an optical sensor able to read the register mark and automatically transmit the data for a perfect alignment between the sheet and the transfer support. The machine's printhead and the grippers which position the sheet on the worktable are independent and this allows an easy control of the positioning. The sheet is blocked by the suction system on the printing table. The grippers move the sheet quickly and precisely, conveying it to the next drying phase. The high automation of the line guarantees a containment of human error even in case of an inexperienced operator.

To facilitate operations and optimise production, the machine is equipped with an automatic LPA (Laser Pointing Assistant) positioning system. The times for setting the frame and its positioning are drastically reduced. This tool, in synergy with the OSA, reduces production times.

MS 80 SD AND MS 102 INS

Based on Sakurai cylinder technology, the Maestro MS 80 SD and the Maestro MS 102 INS print onto a wide range of substrates such as plastic film for electronic applications, membrane switches, control panels and touch screens; paper, cardboard and film. They are equipped with independent servomotors that allow an extremely fast and independent movement of the cylinders and the squeegee with respect to the printing frame. This makes them very suitable for industrial printing that requires both precision and frame thickness. In particular, printing accuracy is helped by the fact that the sheet is blocked only when the cylinder is stopped and this prevents any uncontrolled movements. In addition, the first CCD optical camera sheet alignment system for industry can improve productivity and performance up to 80%.

The MS 102 INS Inline version is equipped with photographic inspection technology that allows the operator to identify and consequently operate in real time to reduce faulty printed products. Compared to the traditional flat belt conveyance, the Sakurai method, with cylinder suction, has allowed the stabilisation of the transport to accurately inspect the printed sheets. ■

Claudio Moffa is Sakurai's Executive Officer

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AFIP 2019 CALLS FOR SUBMISSIONS

The Advanced Functional and Industrial Printing conference returns to Düsseldorf on 27–28 March 2019 to provide new inspirations for print in production

Organised for the fourth time in its current guise, the AFIP conference brings together OEMs, suppliers, printers, researchers and production architects to offer an even broader approach to printing technologies which serve the production processes of today and the near future. ESMA members and non-members are welcome to submit their papers and contribute to an agenda full of learning, inspiration and networking that keeps on attracting many newcomers.

The previous edition, in 2016, provided technology insights and real case scenarios for diagnostics. One of the delegates, Gregory Gentile from Apple Inc., summed up the event as "an excellent mid-sized venue that focuses on new technology rather than sale of products – a great environment to learn and exchange ideas."

NEW INPUT

Considered by many as the key contribution to their technology roadmap, the conference continues to unite representatives of various market sectors. Next to hardware, software and ink providers from the screen printing and digital inkjet world, AFIP welcomes input from technology users, emerging start-ups and academic institutions who want to highlight the latest available solutions and the future direction their research is leading them.

At the current stage, ESMA calls for submissions preferably on printed electronics, film insert moulding, automotive, in-mould decoration and in-mould electronics, name plates, industrial fascia, membrane switches, touch panels, sensors, printed batteries, anti-counterfeit, brand protection, bio-medical, consumer goods, colour control, functional coatings, printing with graphene, technical glass printing, technical textiles, thin film applications, process control and additive manufacturing.

ENTICING AGENDA

The first keynote speakers include Professor Timothy Claypole from the Welsh Centre for Printing and Coating at the Swansea University and Jesper Hassel, CEO of the Swedish company Mevia. Prof. Claypole will talk about the recent research in fine line printing of functional inks for automotive applications and Jesper Hassel will present Mevia's 'smart pill' technology which employs printing for pharmaceutical packaging.

Parallel to a conference programme of at least 20 high-level presentations, 25 tabletop stands offer networking opportunities for more in-depth conversations and commercial information exchange. Among the early bird exhibitors are Adphos, Global Inkjet Systems, Grünig/SignTronic, Marabu and Proell.

AFIP conference showcases applications ranging from automotive to bio-medical

REGISTER YOUR INTEREST

Specialist Printing Worldwide is the official media partner of Advanced Functional and Industrial Printing. The conference takes place at the Radisson Blu Scandinavia hotel in Düsseldorf on 27–28 March 2019. The call for papers is now open, along with early bird exhibitor booking, and all interested companies, as well as research institutes can apply by email. ■

Further information:
web: www.afip2019.org

ESMA IN ENGLISH

The third edition of the successful ESMA Academy 'Industrial Digital Printing' will be held in English on 5–8 November 2018 in Stuttgart

Following increasing requests from the participants, the four-day course on theoretical and practical aspects of the piezo inkjet process and related topics such as inks, curing and colour management, is now offered in English. Organisers from ESMA, Fraunhofer IPA and Hochschule der Medien (Stuttgart Media University) are building on the success of the two German editions which provided certified know-how to 40 attendees from the DACH region.

COMPREHENSIVE CURRICULUM

The first alumni of the ESMA Academy praised the comprehensive curriculum with a good balance between theory and practice. For the upcoming edition, the programme remains unchanged and gives an overview of both technology and its applications. Theory blocks include piezo inkjet, inks and substrates, mechatronics and electronics of the printing systems. Practical sessions, held at the work stations in the laboratories of Fraunhofer Institute for Manufacturing Engineering and Automation, include ink characterisation, determination of print parameters, drying and cleaning mechanisms, fluidics and electronics, quality evaluation and colour management. After the successful completion of the course, each attendee receives a certificate.

ESMA Academy is aimed at companies who want to obtain a well-founded overview of digital printing technologies in order to make educated decisions on how inkjet could be integrated into their production process. Course tutors are renowned industry and academia figures, experienced in transferring know-how, and the pros and cons of digital processes.

For the detailed programme and registration please visit the website. The next edition of ESMA Academy in German is scheduled for early 2019. ■

ESMA Academy is held at the laboratories of Fraunhofer Institute for Manufacturing Engineering and Automation in Stuttgart, Germany

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ESMA
Driving Print Excellence

INPRINT 2018 TAKES INDUSTRIAL PRINT TO ANOTHER LEVEL

The second edition of InPrint Italy promises a revolution for industrial printing technology

Since the first edition of the show in 2016, technology has developed considerably: inks have improved, heads are now more robust and resolution even higher; engineering has become more developed and sophisticated, software is able to process data faster and the performance of industrial inkjet and screen printing is generally more compelling for manufacturing onto a wide variety of surfaces. Not only that, the manufacturing world has grown more accustomed to industrial printing technology and how to best exploit its potential for the future.

All the research conducted by IT Strategies and InPrint highlights that 2018/2019 is the biggest year yet for industrial inkjet growth and points towards accelerated growth for industrial print technology. This year's InPrint Italy promises to be a key event in the development of industrial printing whether it be industrial inkjet or screen printing.

The InPrint show itself has the vision to connect new markets, create new possibilities, and will unlock new opportunities for advanced print technology for manufacturing. Visitors represent different industries, from automotive to packaging, and from pharmaceutical to sporting goods manufacturers, with the core driver being sourcing customised printing solutions for industrial applications.

As well as a range of exhibitors to visit there is also a full and comprehensive conference and seminar programme taking place throughout the three days. The sessions cover a range of topics including TCM Surface Decoration sessions, the IMI technical workshops, a number of interesting industrial case studies and themed streams. There will be over 60 speakers and the sessions which are free to visitors, will be in both Italian and English.

EXHIBITING COMPANIES

3M: one of the world's leading suppliers of membranes, active in the fields of healthcare and industrial filtration and separation applications.

Aeoon Technologies: designs and manufactures digital textile printers and has an extended knowledge and background in screen-printing and experience in direct to garment printing.

Agfa Graphics: will showcase dedicated industrial inkjet solutions and applications including decoration, serialisation, product printing and marking and coding.

Ardeje: develops industrial solutions intended to facilitate clients' technological mutation in the field of objects decoration or printing in full colours.

AROJA XORFEX: manufactures highly productive digital printing machines for large-format panels and special printers for rotary items.

Armor Inks: designs inks which are tailored to match clients' individual requirements in their individual inkjet printing production.

Bergstein: will present a 3D virtual reality of its Industrial Digital Single Pass Printer DIGI 7, enabling visitors to look inside the machine.

ColorGATE: provides innovative software solutions, RIP Software, and printer driver technology for Commercial and Industrial Printing.

DEVStudio: has over 20 years of experience in the development of RIP solutions for the Retail market and software (custom and OEM) in the field of Digital printing and colour management.

DoDxAct: provides technical consultancy

Technology has developed considerably since the first edition of the show in 2016

InPrint 2018 is a must-visit for any manufacturing specialist is looking to integrate new printing technologies, improve on their existing processes or introduce a revolutionary new digital system into production

throughout the industrial inkjet supply chain from ink makers to OEMs.

Epson: has designed and manufactured its SureColor large format printer ranges for exceptional results in terms of precision, print quality, efficiency and productivity.

EPTANOVA: leads an extended know-how in providing complete advanced finishing solutions to a variety of industries.

ESC: supplies printing machines for producing industrial products; its latest innovation is a multi-colour industrial screen printing line in modular conception with integrated robot systems, state-of-the-art drying technology and production monitoring.

Excelitas Technologies Corp: delivers innovative, customised phonotic solutions and will showcase its wide range of OmniCure UV LED Curing Systems.

Fujifilm: has a comprehensive portfolio of inkjet technologies and expertise for packaging, industrial and many other applications. Highlights include: single-pass print engines and print bars with Samba printhead technology, high-quality aqueous and UV inks, custom print engine integration and imprinting systems.

Heidelberg: will be highlighting the trend towards customised printing on objects which it believes offers unique new business opportunities.

At InPrint 2018 Heidelberg will present its Omnifire technology with exciting new functions on a shared booth together with **Plasmatreat** (see right).

Inprinta: is the inkjet sales division of Porvair Filtration Group. Inprinta offers solutions to inkjet requirements through capsule, in-line, last chance, and bulk ink filtration.

Integration Technology: offers the largest product portfolio of UV and UV LED curing solutions in the world.

IPCO: the world's largest manufacturer of solid and perforated steel belts, will use InPrint 2018 to highlight the benefits that steel belts can bring to digital print lines.

Martinenghi: designs and produces advanced machines for manufacturing aluminium and plastic tubes, aerosol cans and beverage bottles.

Meteor Inkjet Ltd: develops and supplies electronics and software to drive industrial inkjet printheads from Dimatix, Konica Minolta, Kyocera, Ricoh, Seiko Instruments, Toshiba TEC and Xaar.

Mimaki: is displaying a wide range of industrial printing and cutting solutions. The company will bring 3D samples that show the potential of its full colour 3D printer for rapid prototyping, mould manufacturing, modelling and more.

Natgraph Ltd: is Europe's largest manufacturer of conveyorised dryers, using forced air, infra-red energy and ultra violet radiation.

OMSO: has been designing and manufacturing high-tech machines to print on objects and containers for more than 60 years.

Phoseon: is a world leader in providing UV LED solutions, with over 270 patents and trademarks and more than 90,000 units shipped.

Pigmentinc BV: the European division of Impression Technology, designer and manufacturer of a range of innovative inkjet and print finishing technologies, will present the Compress iUV range of flatbed UV printers at InPrint 2018.

Plasmatreat: will share a stand with **Heidelberg** to jointly present the Omnifire, including Openair-Plasma technology which allows direct-to-shape printing on objects in any shape. Plasmatreat will also present its new PTU1208, a fully automated inline plasma cell for the pre-treatment and functional plasma nanocoating of flat objects, such as glass, in continuous serial printing processes.

ProPhotonix: will exhibit its complete range of UV LED Curing systems on Stand 148.

Roland DG: is a leading global supplier of high quality wide-format digital inkjet printing and cutting devices, engravers, 3D printers, inks and software.

Sakurai: provides complete solutions dedicated to industrial processes of screen printing – from prepress to printing units, from drying to integrated solutions with accessory processing. At InPrint it will showcase the fully automatic Maestro MF80VII Smart Textile printer.

Siegwerk: will be showcasing its customised inkjet inks for personalised packaging and label applications

Sun Chemical: a member of the DIC group, is a leading producer of printing inks, coatings and supplies, pigments, polymers, liquid compounds, solid compounds, and application materials

Xaar: designs and manufactures printheads as well as systems for product decoration and 3D Printing which use Xaar's inkjet technology.

Visit the InPrint website for the latest full exhibitor list.

PRE-REGISTER FOR FREE NOW

Free entrance to the show is available via pre-registration at the website. This means you will not have to pay the entry fee of €30 on arrival at the venue and it will speed up access to the exhibition. ■

Further information:
web: www.inprintitaly.com

CHAMPIONING INKJET

Bruce Ridge interviews Debbie Thorp, Business Development Director at Global Inkjet Systems

Debbie Thorp, Business Development Director at Global Inkjet Systems

Debbie Thorp has worked in digital printing for over 25 years and is Business Development Director at Global Inkjet Systems (GIS), a leading developer of RIP software, drivers and electronics for industrial inkjet printheads. Earlier in her career, Debbie worked for over 10 years in senior positions at specialist digital printing consultancy companies such as IT Strategies, and was Head of Group Marketing at inkjet printhead manufacturer Xaar for four years. Before joining GIS, she was VP EMEA Operations at iTi, an inkjet system integrator. Debbie has a BA degree in Modern Languages from Manchester University and an MBA from Durham University Business School.

Conducted in August 2018 by Bruce Ridge, this interview with Debbie Thorp is the latest in a series of articles intended to provide insight to the future of our industry from the perspective of members of Academy of Screen and Digital Printing Technologies.

BR: Congratulations on being the first purely inkjet technology member of the Academy of Screen and Digital Printing Technology. What did you know about the Academy prior to being nominated and inducted?
DT: I knew that Vince Cahill and Steve Duccilli were members and as soon as I was nominated, I investigated the membership and found many of the Academy members are people in the industry I have known of and respected for a very long time.

BR: You have an MBA, but your first degree from Manchester University was in Modern Languages – did you travel to another country to complete the degree?
DT: I studied Russian and French and spent three months in what was then the Soviet Union at the University of Minsk, and also lived in France for a year. Although there weren't many opportunities in business to use Russian when I graduated, I knew that I wanted a career working with international companies – and also one where I could use my skills in research and analysis. This has become my passion, and fits perfectly with the digital printing industry as it is such a dynamic environment; there is always more to learn – new markets, applications and technology to understand. I happened to apply for a job at a digital printing consultancy and I loved it from the very start – I worked for IT Strategies with Mark Hanley for many years and also at the company that is now known as InfoTrends.

BR: My impression is that GIS is primarily a software development company?
DT: Yes, that is correct – our Atlas software platform is a key part of our portfolio, but we do much more too. We supply the OEM equipment manufacturers and integrators with the key components that they need to build inkjet printing systems. We are high up in the supply chain alongside the printhead manufacturers as providers of core technology. We provide application software, user interfaces, drive electronics, RIP software, and the fluid delivery system components.

My focus is to help people understand what inkjet can achieve and how GIS technology can enhance existing products and also provide access to new market opportunities. It's interesting, but end-users don't question inkjet as much as they used to. It has demonstrated that it is a proven technology – it's shown it can be reliable in true production environments.

BR: How long ago do you think that changed – the perception of inkjet being reliable?
DT: I think the tipping point was drupa 2016. I did not hear people talking about the problems that used to make them nervous about inkjet, like blocked nozzles. The discussions were mainly on productivity and the quality of the output. People were looking at the printed output and seeing that the systems were delivering the quality and productivity suitable for their market – product that they could sell. But of course, in order to achieve that, there is a lot of very smart technology under the hood of these fantastic machines. A lot of what is driving that reliability and high-quality output is software.

BR: Has printing or imaging been a welcome challenge to your focus in business development?
DT: Digital printing has been my whole career and will continue to be, I hope. I'm not an engineer or chemist by training, or have been a hands-on printer like many of the Academy members, so I have learned by immersing myself in the industry. For the first 10 years of my career, I was primarily working as a consultant helping companies understand their markets through research and analysis and also bringing new products to the market. In the early days I focused on consumables – inks, paper, film – which has been invaluable – and I've seen the inkjet market develop from an office technology, to wide format and now into an ever-increasing range of industrial markets. When I was at Xaar and now at GIS, I get a great deal of satisfaction going to a trade show and knowing that we had a part in bringing a product on display to fruition. Often this may entail bringing several companies to work together in the development of the product.

BR: You have been involved with the development of inkjet print technology from the very early days. What are some of the most exciting developments you have been involved with?
DT: I think the introduction of the first inkjet flatbed was significant at drupa 2000. I was working at Xaar when we had customers developing flatbed systems. Inca Digital was the first – and followed by many others. The XaarJet 500 printhead brought a new level of productivity at that time and – combined with the introduction of UV curable inks – opened up printing onto a new range of media. It was a real turning point.

BR: What are the most important trends in ink-jet development that you see happening now?
DT: Inkjet being used as part of the manufacturing process is a key trend. These are not always the type of machines you would see at a trade show – they are often built for specific manufacturing applications – kept hidden and used behind closed doors. This makes inkjet just another step in the manufacturing process. Sometimes it's still being used for decoration – so still graphics – but increasingly inkjet is viewed as a deposition device for jetting a functional fluid. This is also linked to printing direct to three dimensional shapes – like tubes, cones and tubs – and also more complex industrial products using robotics. With robots, this is being done by either the robot presenting the object to the printheads, or a robot with an inkjet printhead mounted onto the robot itself. There is a huge amount of software that is being developed in this area.

BR: When GIS makes software to run specific printheads that may be used in different OEM machines, do you have special print testing devices to test the software and printhead?
DT: We do have some small test rigs in-house, but they are not commercial systems. Our

software can simulate and test systems of any size – any configuration – it's done virtually.

BR: Inkjet technology has changed the printing technician from mechanic to an electrician or software expert. How do you see this affecting the final image? Do you think the craft aspect is gone?
DT: I think the craft is still there. Optimising and tuning the system to achieve the best possible results with inkjet still requires craft and knowledge of print. Leaning over a finished print with a loupe may not be necessary in all applications, but the need for the highest possible print quality doesn't change in applications like primary packaging, where colour stability, solid flat blocks of colour, and first-to-last print consistency are critical. There is craftsmanship and technology involved throughout the process; in every part of the system – inks, media, curing and more. Everything has been tuned to work together – it's just that we take it more for granted now.

A simple example is what we consider plain paper in the office. That paper was specifically developed and manufactured to print with optimum results in a laser printer and an inkjet printer – mono and colour. That took huge investment, but it's largely forgotten now and we take it for granted – it's just 'plain paper'.

BR: Are the GIS Print Manager Boards manufactured in the UK? Do you know if those boards are screen printed or imaged by another method?
DT: GIS designs the boards and they are manufactured in the UK. Although inkjet is making inroads in solder mask and dielectrics, I understand our manufacturers are just using traditional processes. Manufacture is focused in the UK to ensure the yield is high. Even then we test every board in-house before it's shipped to a customer.

BR: When you were at the SGIA show last year, did you visit the golden imaging area and if so, what was your impression of the entries?
DT: The inkjet prints – yes. I look for fine details, flesh tones, stitch zones and the most difficult thing to print in inkjet, large areas of solid flat color.

BR: The fact that each print process has its own limitations emphasizes the need for good education in the design area to design for the process?
DT: Digital offers huge opportunities for the designer, but education is critical – and in sectors where digital is a new phenomenon that is challenging. Brand colours, spot colours often fall outside of the gamut of CMYK digital presses. So when it comes to trying to reach the full Pantone range of colors some of the digital equipment manufacturers are adding additional colors to supplement the CMYK gamut – with seven colours some systems can reach 95% of Pantone. Designing for digital can help manage expectations.

BR: When you go to a trade show, do you ever attend seminars and if so what are you looking to learn or find out?
DT: When I can – yes. But at trade shows, I really concentrate on learning about new products, new applications – how OEMs are positioning their products and how old problems are being solved by new technology. I have found that I'm going to more specialist trade shows – Ligna, the wood processing show in Europe; Drinktec for the beverage industry in Munich where they are printing direct onto containers, and to the K Plastics show – because inkjet is starting to get into printing on all the unusual plastic shapes that have traditionally been decorated by IML, IMD, float graphics or pad printing. I also read trade journals looking for case studies about people's experiences with inkjet.

BR: What would you like to see the Academy do for the industry?
DT: I think what you are doing with these articles to raise the profile of Academy members is very positive – it shows the range of knowledge of the members. I am currently chair of ESMA, originally the European Screen Manufacturers Association, but which is now about 50% inkjet companies. We have a team called the ESMA Experts that have decades of experience. This group writes educational articles; they have a portal on the website for answering questions; and at trade shows or conferences there is an area where you can meet and talk with these industry experts. Maybe that is something the Academy could consider – to share knowledge.

BR: Academy membership has primarily been an acknowledgment of the work done by individuals that have given back to the specialty printing industry committing time to educate and communicate for the betterment of the industry. Thank you for your contributions. ■

The Academy of Screen and Digital Printing Technologies (ASDPT) is composed of professionals that have dedicated a large part of their career to the education, development and innovation to the industry. This interview was conducted by Bruce Ridge, Director of Technical Service, Nazdar Ink Technologies. Bruce has been a member of the Academy of Screen and Digital Technologies since 2004.

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SGIA appoints VP of Sales & Business Development

Michael C. Buggé has joined the Specialty Graphic Imaging Association (SGIA) as Vice President, Sales & Business Development. Buggé most recently served as Acting General Manager and Vice President, Sales, Glunz & Jensen.

"With more than 30 years of successful ventures in the manufacturing of graphic arts prepress equipment for the offset commercial print and flexo packaging markets, Mike brings strategic vision and deep understanding of the printing industry to his new position," explained SGIA President & CEO, Ford Bowers.

Buggé will work with SGIA members to enhance the value of their memberships through marketing opportunities including event sponsorships, trade show booth sales and SGIA Journal advertising.

"I look forward to meeting the SGIA members and growing our partnership by providing additional value and benefits to their businesses," said Buggé. "I'm very excited for the opportunity to be joining an organisation that has the vision to see and understand the merging of all printing technologies." ■

Expansion prompts location upgrade for Meteor

Meteor Inkjet, independent supplier of electronics and software to drive industrial inkjet printheads, has expanded into a new location at Harston Mill near Cambridge, UK.

The relocation follows growth that is largely due to a healthy export market. Sales have more than doubled in the past two years and to support this growth, Meteor's team has expanded in Harston as well as China, Japan and the USA.

The Meteor Inkjet team outside their new premises at Harston Mill

Meteor's new facilities at Harston Mill offer plenty of room for the growing team as well as purpose-built labs for developing, testing and demonstrating electronics, software and components.

"We were getting very tight on office, lab and stockroom space at our previous location", explained Clive Ayling, Managing Director, "and we lacked sufficient room to host an increasing number of customer visits. In many respects our expansion marks a new beginning as we move out of the premises where the company was founded by TTP Group 12 years ago into a space that we've designed to suit our specific requirements," he concluded. ■

Easiway grows sales force

Alex Mammoser has been named corporate sales director of Easiway Systems, manufacturer and supplier of eco-driven cleaning and reclaiming products for the screen printing and graphic arts industry.

In addition to his two years as a regional sales manager with Easiway, Mammoser has a broad background of nearly two decades of experience in the screen printing industry. In his new position he will manage and grow Easiway's sales force as well as its international and domestic distribution network.

Alex Mammoser has been promoted to corporate sales director of Easiway Systems

"Mammoser's talent and experience will lead our sales force to great places; ultimately continuing Easiway's quest to carry the best screen chemical products to a world stage," said John Schluter, president and CEO of the company. "We are excited to watch him thrive in this new role, being a vital part of the company's growth going forward." ■

Kissel + Wolf celebrate 125th anniversary

A party was held at Kissel + Wolf's headquarters in Wiesloch to celebrate the company's 125th year of manufacturing and selling chemical products for screen and textile printing. An international mix of 800 guests consisting of current and former employees, their families and friends gathered in the July sunshine to hear a short welcoming address from owner Richard David Eisenbeiss, who thanked all employees and partners. "We owe our success today to the competence and dedication of our employees," stated Eisenbeiss. "We also set the right course years ago," he emphasised.

Richard David Eisenbeiss, owner of Kissel + Wolf Group, welcomed guests to the company's '125th anniversary' party

Insights into the company's activities were given during tours around the various departments, and guests enjoyed a barbecue buffet together with music from a DJ and a live band. A demonstration of what happens why a fat fire should not be extinguished with water (explosion!) was given by the Wiesloch Fire Brigade. A programme of children's games and activities allowed the parents to relax and football fans could even follow the FIFA World Cup game live. ■

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- COLOUR MANAGEMENT EXPERTS
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- TECHNOLOGY USERS (KEYNOTES)

WHO WILL ATTEND?

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- BRAND OWNERS
- PRINTERS
- RESEARCHERS
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W&H chooses Xaar for digital development

Windmöller & Hölscher (W&H), producer of machinery and systems for the manufacturing and converting of flexible packaging, is developing its first digital, single-pass press for flexible packaging using Xaar 5601 printheads. The printhead was selected as a result of successful performance tests conducted over several months last year.

"We are delighted to be developing our latest system using the Xaar 5601," commented Hermann Veismann, General Manager Business Unit Printing and Finishing at W&H. "We saw an opportunity for digital printing in flexible packaging, driven by the need for faster time-to-market and very short order lengths, and aim to overcome the traditional difficulties in this area using our expert knowledge and outstanding new technology."

"The new digital machine will be characterised by higher quality and higher speeds and opens up new possibilities in flexible packaging," explained Sven Michael, head of the W&H digital team. "It includes the Xaar 5601 printhead, which achieves excellent print quality at high production speeds."

Windmöller & Hölscher is the first OEM to publicly announce that its next generation of printers will be driven by the Xaar 5601. The development is also a first step into digital solutions for W&H.

"This announcement is a significant milestone for Xaar," commented Doug Edwards, CEO at Xaar. "Windmöller & Hölscher is a major player in the flexible packaging machinery market and is renowned for placing innovation at the heart of its new product developments. I'm delighted that the Xaar 5601 has been selected for this new development on the basis of the printhead's high performance." ■

Xaar's 5601 printhead offers new opportunities for digital printing in flexible packaging

M&R promotes team members

Previously International Sales Manager, Dave Blake has been promoted to Vice President of Sales after a 12-year tenure at M&R. Going forward, Blake will be overseeing North American Sales, International Sales, Customer Service and M&R Digital Sales to further unite the M&R sales force as a single cohesive team.

New Executive Vice President Peter Walsh will apply his end user and industry experience to lead M&R's executive initiatives into the future. Walsh will be overseeing Technical Services, Engineering, Marketing, and Product Management.

Glen Carliss has progressed from Regional Sales Manager to become Director of Sales – USA & Canada. He is charged with building a customer focused team to teach, help, and inform the current and next wave of M&R customers.

Tolga Efendi is a 13-year veteran employee of M&R currently heading up the company's west coast sales division. As Director of Digital Operations, Efendi aims to grow M&R's Digital operations into a world class division, pushing new technology to broaden the product range.

Michelle Smudde has been with M&R for a little under a year, but her passion for HR and the betterment of employees has seen her take on the position of Director of Human Resources. ■

InPrint USA reveals show strategy

A survey conducted by the InPrint Show indicates current adoption of industrial print technology taking place mostly in the packaging industry, specifically flexible packaging, with printing for corrugated packaging a close second. Packaging and décor markets both ranked high for industries showing the most promise for immediate opportunity, and functional printing as the most technically challenging of the markets. Respondents also ranked North America high as a market showing strong growth potential for industrial inkjet.

Helping connect that North American industrial print market is a main reason the show selected Louisville in Kentucky its 2019 location. "Louisville is ranked 8th in the nation for manufacturing," stated Kevin Jackson, InPrint USA Exhibition Manager. "Being centrally located in the Midwest and within a day's drive of over half the US population puts the InPrint show strategically in a better spot to attract the key executives and R&D personnel our exhibitors want to meet."

To help identify those key executives, InPrint has developed partnerships with leading print and end-user market associations. To date these include NAPIM, the National Association of Printing Ink Manufacturers and the Kentucky Automotive Industry Association, which represents nearly 95,000 people employed in more than 500 automotive-related manufacturing, service and technology establishments. "We are very excited about the partnership with InPrint USA," said Dave Tatman, Executive Director, KAIA. "It is critical for our members to be aware of new solutions and cutting-edge technology for automotive manufacturing and we are thrilled that InPrint USA is bringing cutting-edge solution providers right to our backyard."

InPrint USA takes place over 9–11 April 2019 in Louisville, Kentucky. ■

The packaging industry is adopting industrial print technology

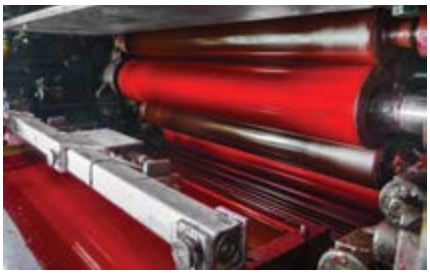
Agfa ECO³ software reduces ink consumption by 30%

InkTune and PressTune are software solutions from Agfa Graphics that aim to increase the productivity and the profitability of printing businesses by reducing paper, ink and energy consumption and improving print quality. The releases are part of Agfa's ECO³ concept, which focuses on ecology, economy and extra convenience.

Based on GCR (Grey Component Replacement), which replaces a certain percentage of the expensive CMY inks by cheaper black (K) ink, the InkTune software offers users better ink settings, less interference between different inks, faster drying times, improved colour consistency and optimum on-press printing stability, even at high speeds. The software also contains DLC technology (Dynamic Low Ink Coverage) which intelligently scales the total amount of ink, improving printing stability. By reducing the amount of ink in the colour separations, images become brighter and more detailed. The rosette structures become less pronounced, less anti-offset powder is needed and it becomes easier to maintain the right grey balance.

Compatible with any printing technology or press model, PressTune ensures that print jobs are printed consistently, meeting ISO, G7 and customer specific colour standards. An algorithm for dynamic density adjustment provides the best possible ink density for every print job, while Agfa's Dryback Compensation technology calculates the ink's drying effects, guaranteeing colour fidelity to the end customer. The software also identifies possible issues on the press and facilitates remote print quality approval. The combination of these elements reduces ink and paper consumption, improves communications between all stakeholders in the printing process and ensures that more jobs can be done in less time.

With its process control and analytics capabilities, PressTune helps create the ideal environment for InkTune to ensure maximum ink savings. In addition, the cloud-based PressTune solution allows printers to deploy InkTune across different printing sites, to reduce costs and promote consistency across the board. ■



With Agfa's ECO3 solutions, printers can save up to 30% on ink and paper and up to 90% on water, while waste can be reduced by 50%

PressTune shows a summary of the quality score of the various parameters of a job, as well as the overall job score. It also provides insights on each measured press sheet for the various quality parameters such as lab value, density, tonal value increase, production mode, measurement, and score trends

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