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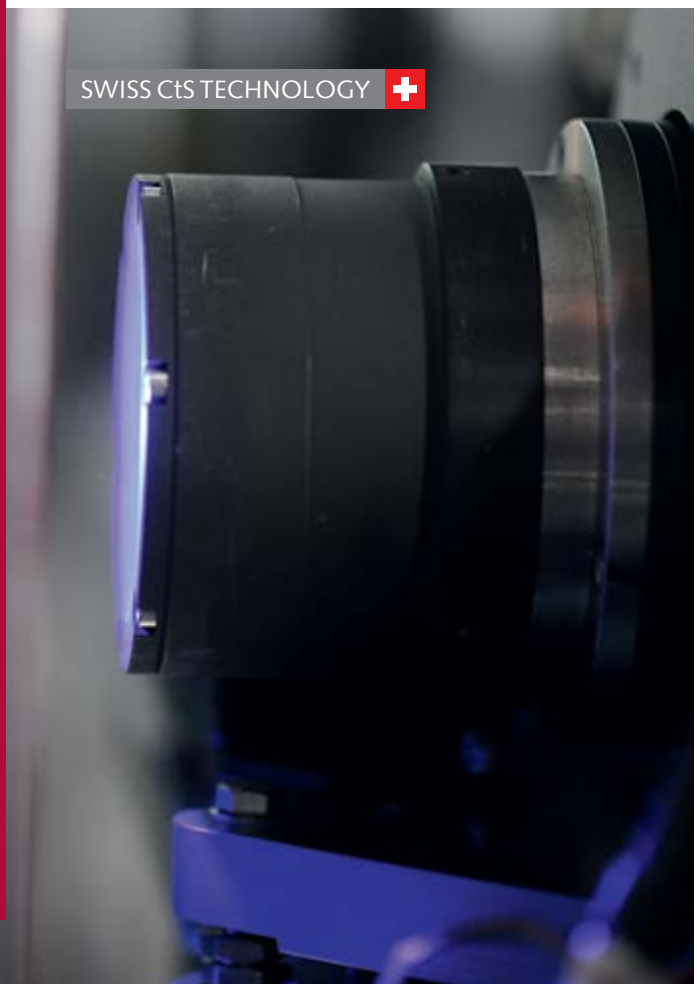

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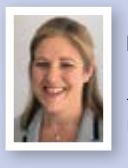

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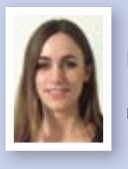

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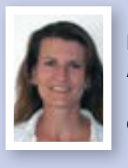

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Welcome • Benvenuti • Bienvenue • 欢迎您 Willkommen • Bienvenido • Добро пожаловать

Having overseen the success of *Specialist Printing Worldwide (SPW)* since its conception in 2007, I am very pleased to announce a new and exciting era for the magazine.

From Issue 1 / 2020, SPW will be published by Chamond Media Ltd. I will continue as Publishing Director, with my daughter Nicola Penhallow joining as Publisher and being the primary point of contact for all matters relating to editorial, advertising and distribution. Assisting with a long-term handover period, our friends at Chameleon Business Media will retain an interest in the magazine but moving forward their focus will be on their glass media portfolio including *Glass Worldwide* and GlassPrint.

We are delighted to welcome Nicola, who has over 20 years of international commercial experience in a variety of industries including container shipping, media and accountancy. She has used her marketing degree and extensive sales experience to help small and medium businesses grow. Nicola will be attending many of the forthcoming industry events around the world and is thrilled to have the opportunity to further assist our customers in growing their businesses by sharing their technical expertise and products through *SPW*.

Having bucked the general trend of trade magazines and achieved consistent growth in terms of content, readership and advertisers, *SPW* is deeply entrenched in the industry's global and regional communities throughout the industrial, graphic and textile sectors. The expanded publishing team will now further cement our position as a unique provider of technical and educational material to users of screen and digital printing systems, offering practical solutions to the everyday issues faced by our ever-growing readership.

Building on the core strengths of *SPW*, we look forward to working with our subscribers, advertisers, editorial contributors and partner trade associations and event organisers to offer new and exciting opportunities to meet the industry's needs.

Please do not hesitate to get in touch with any comments as to how we can continue to improve… and if you are not a regular reader or advertiser, visit www.specialistprinting.com for details on receiving the next issue or to download 2020 media information.

Bryan Collings, Publishing Director, Specialist Printing Worldwide

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TASTE OF SUCCESS

Simon Daplyn explains how product safety is key to driving business when digitally printing onto food and pharmaceutical products

From the introduction of date coding onto eggs to the digital images adorning today's birthday cakes, printing onto food and pharmaceutical products has long been established and there are now thousands of food and pharmaceutical items printed every day. Brand identity and differentiation is key to delivering repeat business but protecting your brand by using safe and assured materials in product decoration may be a greater concern.

Inkjet printing offers an exciting opportunity for decorating edible products. Free of the design limitations that restrict current decoration methods such as pad printing, a digital process can allow for faster market response, country versioning and economic short runs. This opens up the potential to switch from a print-and-distribute to a distribute-and-print model of operation, moving from mass production to mass customisation. The ability to add unique codes to pharmaceuticals to mitigate the risk of counterfeits may also bring significant benefits.

Once printed, the ink essentially becomes an ingredient in the final product

In today's consumer driven market, the demand for personalisation and traceability for

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items such as baked goods, confectionary, pills and capsules is greater than ever before. However, so are the risks from micro contamination, heavy metals, pathogens or adulteration. These can affect consumers and businesses alike, leading to recalls or worse. There are more and more digital inks available today from all over the world, and protecting your brand and business by using safe and assured materials should be a primary concern. The question is, if you do not know exactly where the inks are being manufactured and packaged, how do you know what is in them?

When formulating an inkjet ink, quality of materials and processes is paramount, even more so when handling edible ingredients for printing onto products that will be consumed. It is important to not only consider the impact on the final product but that materials selected print consistently and reliably in an industrial process. Ultimately, it is the ink that becomes a part of the final product and as such represents the brand.

INK REQUIREMENTS

For an ink to be viable in any digital printing process, fundamentally it has to print correctly. When considering printing fully edible materials, there are restrictions in the availability of suitable materials and additives. Many typical co-solvents and surfactants cannot be considered and so there is a significant challenge in formulating to the right specification and in controlling drop formation, wetting behaviour and colour performance. For example, edible materials to allow control of the ink flow and drop formation whilst balancing the behaviours of the drop on a range of surfaces and structures are not easily identified. In addition, there are strict regulatory requirements and regional legislations meaning that not all inks are suitable for all geographic locations. Compliance to food safety standards is critical and today, there is no global standard. Once printed, the ink essentially becomes an ingredient in the final product and is subject to the same requirements. In today's market, the majority of edible inks are based on synthetic colorants with atypical CMYK inkset possible; if considering natural colours, colour management becomes an important consideration.

Baked goods decorated with inkjet

MANUFACTURING CONSIDERATIONS

Once an edible ink is formulated, there remains a significant challenge in manufacturing, where the risk of cross-contamination and adulteration is highest. There can be no material introduced into an ink used to decorate edible consumables that may lead to downstream impact on the final product. To be considered safe for consumption, any edible ink should be manufactured in a facility certified for Good Manufacturing Practice (GMP). GMP is a system for ensuring that any product manufactured is consistently produced and controlled according to quality standards. The process is designed to minimise any risks involved in production that cannot be eliminated through testing the final product and is standardly enforced in industries such as pharmaceutical. This will often mean a dedicated GMP certified area of a manufacturing facility (if not globally certified), and dedicated use of mixing and filtration equipment. It is also important to ensure that any packaging used does not impact the content of the ink.

PRINTING AND SUBSTRATE

Once an ink is manufactured, safely and consistently there is still the hurdle of printing and ink-substrate interaction. Printing relies on the ink and hardware to be compatible and to understand the operation of printhead, software and system. For the substrate, there is a large variation in material and consistency of surface and so the ink needs to be as 'universal' as possible. Printing a cookie, icing sheet or onto rice paper where the relative absorbency of the substrate is high, the colour strength and edge control is often the area of concern. Other food items like snacks, marshmallows, chocolate, for example, have different uniformity and often fat or oil content at the surface and so ink wetting can be impacted, influencing the final visual appeal of the product. Pharmaceutical items such as pills, hard coat pills and capsules all have different materials and surfaces, which can challenge the image quality and consistency.

When all factors are considered, printing on food and pharmaceutical products is complex but the rewards of a growing market balance the risks in managing the supply and process to ensure compliance and performance. Tight control of supply chain and materials traceability, stringent quality testing and compliance with industry best practices are essential to understanding and delivering a product that is fit for purpose. Inkjet printing has the potential to meet all of the requirements of the industry whilst adding significant value to a brand looking to appeal to the consumer of today.

Sensient food colorants and digital inks are manufactured in FDA- and GMP-certified facilities, with the company having extensive experience of the product safety and regulatory requirements needed to be compliant with food and pharmaceutical standards. Sensient Inks has taken standards one step further by designing its own assurance plan to ensure assurance in product quality and safety. ■

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Simon Daplyn is Marketing Manager at Sensient

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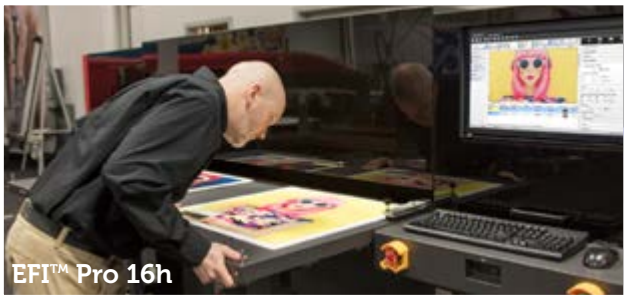

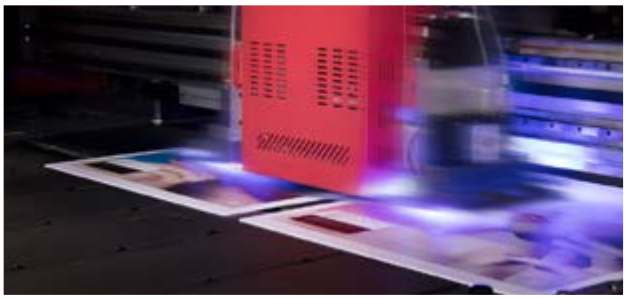

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STOP PRESS

Mark Clewell outlines five reasons why automatic screen printing shops still benefit from running a manual press

An automatic screen printing press may out-produce a manual press many times over, but it does not eliminate the need for one, even in high volume shops. Here are five reasons why:

1. SMALLER JOBS

Manual presses can be more economical to operate when printing smaller runs. They can be set up faster than an automatic and free it up for larger production runs. Setting up a large automatic press for 50 to 100 shirts isn't cost effective. Manual presses can produce a quality print more efficiently for smaller orders. Or, if the manual press is an 'all-heads-down' model, two or more smaller jobs can be completed simultaneously, limited only by the combined number of garment colours and the number of printheads.

2. ATYPICAL JOBS

Manual presses can be used for printing atypical projects like umbrellas, hats, trouser legs or pocket t-shirts. They offer greater control than automatic presses when printing over a seam or on a shirt with buttons. While an automatic press performs the same stroke with the same pressure repeatedly, a manual press operator can readily adjust the length and pressure of a stroke to accommodate zips, seams or umbrella frames.

3. PROOFING JOBS PRIOR TO AUTOMATIC SETUP

Another use of a manual press is 'proofing' a job before doing large production runs on an automatic press. An operator can 'strike off' a sample garment to send to the client for approval. Once approved, the shop can then set up the production run on the automatic and check output against the manual proof, avoiding a costly large-scale remake.

Vastex' BigRed V Series dryers are offered in 30ins and 54ins belt widths, each with 3 or 4 heaters per chamber. The 54ins models with 4 heaters can cure over 950 shirts/hr printed with plastisol ink and 475/hr printed with water-based ink

The industrial-grade model V2000HD-66 is Vastex' six-colour, six-station, all-heads-down screen printing press, expandable up to 10 colours and 10 stations

4. ADD PRODUCTION CAPACITY

A manual press can be utilised for additional production capability when meeting a tight deadline. One operator can be assigned to load and unload the press while another operator prints.

Additionally, printers can speed up production by adding an automated flash cure unit, which rotates the heater over the printed garment when the operator presses a foot pedal, and rotates it away from the garment after a user-adjusted dwell time. This eliminates the need for the operator to manually rotate the heater and visually monitor each flash cure cycle to prevent over- or under-flashing.

The number of jobs a manual press is capable of printing can also be increased dramatically by adding a PIN Registration System, which enables anyone to locate positives onto the screens off-press. This allows the press operator to locate each screen of a multi-colour job on press in register in under three minutes, enabling him/her to continue printing profitable work almost non-stop instead of shutting down for long periods to register screens on press by trial and error.

5. TRAINING OPERATORS

Perhaps the most important reason to keep a manual press in a shop running automatics is to train operators, specifically regarding squeegee pressures, angles and speeds relative to different garment types. Only by honing screen printing techniques manually can operators truly understand precisely what automatics should be programmed to replicate – dramatically reducing set-up times, make-ready and rejects. You've got to walk before you run! ■

Mark Clewell is Senior Sales Technician at Vastex

A VRS PIN Registration Station allows screens to be exposed quickly in register with one another off-press

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JOINED UP THINKING

Dr. Anke Pankoke explores a new technology and a powerful partnership for digital printing on decorative paper with water-based inks

Decorative surfaces must be produced quickly and flexibly in the desired quality and at a reasonable price. For over a decade, attempts have been made to achieve these goals in industrial digital printing on decorative paper with water-based inks – so far without significant success.

One of the main challenges on the technical side is to join the expertise of different market players, such as the machine manufacturers, the printhead manufacturers and the local producers of flooring, furniture and other wood-based materials concerning digital printing on décor paper with water-based inks.

TAILORED APPROACH

Besides the missing knowledge-transfer, the strategic focus of the market players had to be changed completely. Until now they had not realised that the traditional rules of the supply chain had to be revised. The industry doesn't need the traditional huge amount of centrally produced décor paper anymore. To bring the flexibility of digital printing to the local manufacturing sites, you need a digital printing line that fits to the capacities and investment volume that the local plants in the woodworking industry need. Only then the manufacturers of flooring, furniture and other applications can realise the benefits of just-in-time production, low warehouse costs, skipping shipping costs and high output quality at the same time.

Thanks to the development partnership between Hymmen and Ricoh, manufacturers of digitally printed decorative paper now have a strong technology team at their side that ensures the knowledge-transfer and has resulted in a digital printing line named Saturn that is ready to market fitting to the needs of local production sites.

Application	Lines in operation
Finish foil (pre-impregnated)	5
Doors (panels UV topcoat)	1
Flooring (panels UV topcoat)	8
Flooring (melamine process)	4
Decor paper (melamine process)	4
Thermoplastic sheet materials	8
Construction materials	4
Digital Lacquer Embossing	2
Lab equipment	5
Total:	41

Repeated investments by Hymmen customers in JUPITER systems attest to their

- **technological performance**
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Fig. 1: Hymmen JUPITER digital printing lines list of references sorted by application

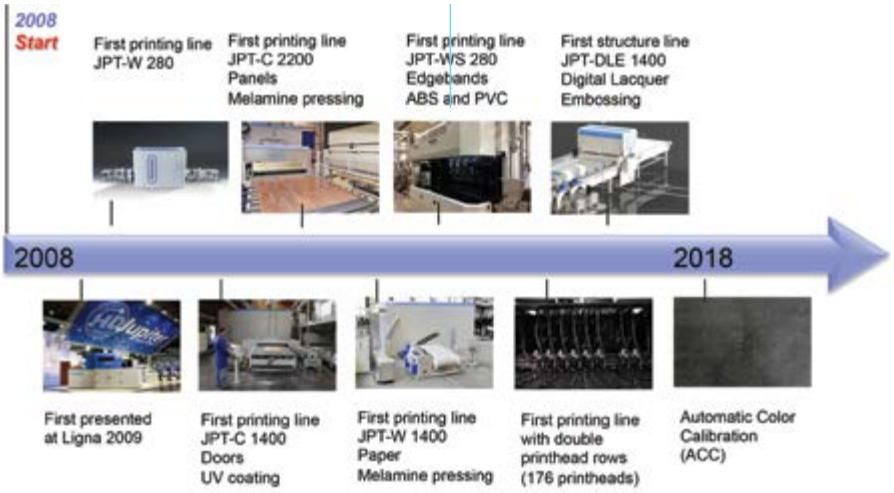

Fig. 2: The history of the JUPITER digital printing lines – a history of dealing with technical challenges

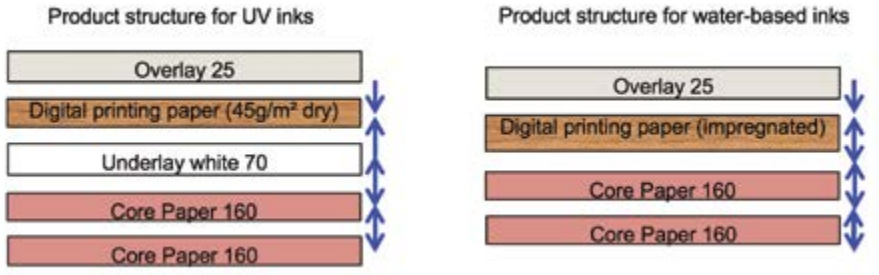

Fig. 3: Comparing the product structure of digitally printed paper

WATER-BASED PARTNERSHIP

A specialist in digital printing in the wood-based materials industry for over a decade, Hymmen has sold more than 40 single-pass machines all over the world (see **Fig. 1**). Major challenges in the development of the complex single-pass digital printing technology have already been mastered (see **Fig. 2**). Hymmen already offers technology for printing decorative paper with UV-curable inks. However, there are applications where the product cannot be built as required for

Continued over

Technical data

Printing speed	15 - 35 m/min
Effective working width	700 / 1,400 / 2,300 mm
Printing color system	standard 4 colors CMY expandable to 8 colors
Additional colors	bright colors and special colors possible in the future
Ink system	water based
Resolution	600 or 1,200 dpi
Printhead type	Ricoh MH5421 MF

Fig. 4: Technical data of the Saturn digital printing line for water-based inks


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UV-curable inks. This is where water-based inks come into their own (see **Fig. 3**). Hymmen's know-how and experience in the manufacture and finishing of wood surfaces as well as its contacts in the flooring and furniture industry make the company an ideal partner for a printhead manufacturer with expertise in water-based ink.

Ricoh has over 40 years of printhead production experience and the company division that specialises in industrial printing is strategically focused on inkjet printing. The core technology comprises printheads with a metal nozzle plate, which are used with a wide range of liquids. Ricoh brings the printhead technology for water-based inks into the development partnership.

The Ricoh/Hymmen partnership boasts in-depth expertise in digital printing technology, the markets, and process management. With a focus on water-based digital printing for decorative paper, the result of the cooperation between the two companies is set to be a product with the goal of offering 'a plug-and-play industrial inkjet solution for the wood-based materials industry.'

SATURN DIGITAL PRINTING LINE

Saturn is an industrial digital printing line that can be integrated into customers' existing production processes. It is a standard machine that offers printheads, ink and printing at the desired resolution for an affordable price.

The Saturn Digital Printing Line (see **Fig. 4** and **5**) is a breakthrough in the production of digitally printed decorative paper (see **Fig. 6a** and **6b**). This system differs from the existing water-based printing solutions in that it is decentralised, more flexible in terms of design for both small and large batches, and not primarily focused on replacing analogue technologies with digital ones.

Saturn ensures minimal storage of decorative papers through just-in-time production. The entire process in the new facility is much easier than with existing decorative printing equipment. Drying the inks is simpler and the printing process is more stable and reliable. Finally, Saturn requires a lower investment volume. **Fig. 7** illustrates the main points.

NEW APPROACH

With Saturn, decorative surface printing is approached in a new way. The dynamic of the supply chain is completely changed. While décor papers were typically manufactured in centralised locations before further processing in impregnation facilities, now the local production of the décor paper is possible. Batch production meets customers' needs quickly, on-demand and skips the logistical overhead such as shipping and warehousing.

As well as bringing technological innovation in print forwards, Hymmen and Ricoh realise that they also need to address critical elements to improve the supply chain significantly. They need to make fundamental changes to the

Fig. 5: The core of Saturn: the printbar shown at Ligna 2019

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Fig. 6a: Digitally printed décor paper by Saturn before (bottom) and after impregnation (top)

Fig. 6b: Digitally printed décor paper pressed on different board materials

way décor suppliers have worked in the past. Improved time to market, quality output and reduced inventory – this is what the on-location printing just-in-time with the Saturn Digital Printing Line offers. Now the flexibility of digital printing also reaches the decentralised production sites.

Owing to the partnership between two established companies in the digital printing market and their combined expertise, Hymmen and Ricoh are your ideal partners for tomorrow's water-based digital printing. ■

Dr. Anke Pankoke is Head of Marketing and PR at Hymmen

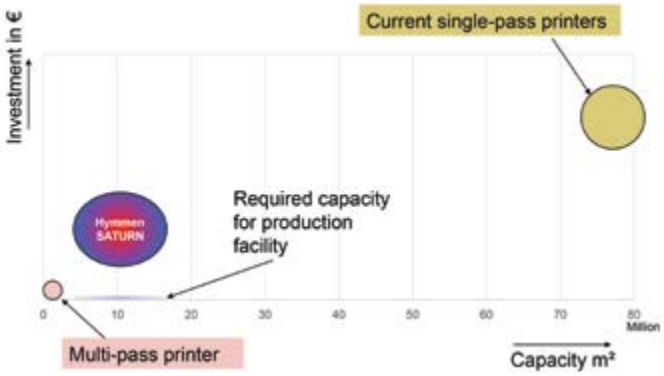

Fig. 7: Comparison of printing machines for digitally printed decorative paper

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SHAPE OF THINGS TO COME

Don Copeland provides a step by step guide to printing on difficult shapes using a flatbed UV press

When we think about UV printing we often think about consistently shaped items in moderate volumes: custom printing golf balls, ID badges, signage and the like. Even one-off items like cell phone and tablet cases are still relatively easy to target because they are basically rectangular.

'Targeting' is the key. That's the process of printing exactly where you want to on an object. Like making sure a photo sits in the centre of the frame. Or printing the lines on a ruler, for a more exacting example. Easy targeting for a UV printing business would include printing text onto a rectangle, or even a logo onto a golf ball where the position really doesn't matter – because it's a sphere.

But with the explosion of the Etsy marketplace [the e-commerce website focused on handmade or vintage items and craft supplies], we are seeing more custom decorated, custom shaped items. That adds a level of complexity that signs and golf balls don't require. In this article we are going to go through the process of taking a custom-shaped wooden item and printing precisely targeted graphics onto an Etsy store-ready piece of art.

THE CHALLENGE

The object we wanted to embellish was a wooden ampersand (&) that had been sanded and painted. We wanted to print the names of the bride and groom on the '&' as well as their wedding date. Because the '&' is not a normal shape we were faced with a couple of challenges. First off – how do you customise the lettering to fit the shape of the '&' and secondly – how do you then target the piece so that the lettering lands where it is intended?

To start off with, we needed a good representation of the item. The first thing we tried [to photograph it with] was a cell phone, but because of the fisheye shaped lens if was almost impossible to get a dimensionally correct picture of the item. So, what to do now?

Our office has a typical colour print, scan and fax system. So we simply laid the ampersand on the scanner and created a file that we could now manipulate to allow us to position the graphics and ultimately target the printed graphic.

STEP 1

Vectorize the image. Bring the image into a programme where you can vectorize the outline of your item. We used Photoshop but you could use Adobe Illustrator, Corel or any number of sign programmes that you might have. Once you have the vectorized outline of the image, save it as a PDF, AI or EPS file and import it into your design software. We used Compress Designer which comes with the Compress UV printers provided by ColDesi.

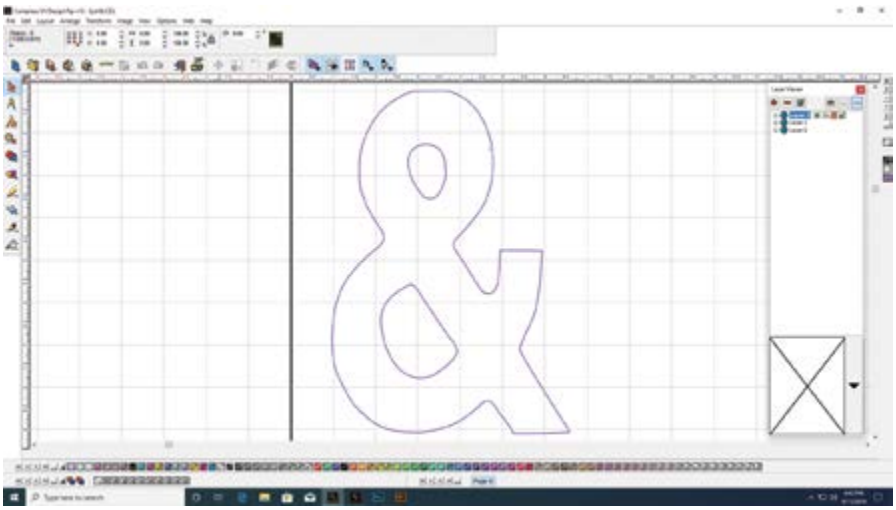
STEP 2

Set up the physical print. Once you have the image in your software, scale it to the height and width dimensions of your item. This should give you a pretty close representation of your item. Position the graphic on your graphic 'page' to a specific spot (I like to use 1ins over and 1ins down from the top). Now, print the design out, relative to your page, onto your print bed if you have a bed that can be cleaned to remove the ink (ColDesi Compress printers and some others come with a silicone mat that not only holds items from slipping but also offers quick clean-up when they have been printed on).

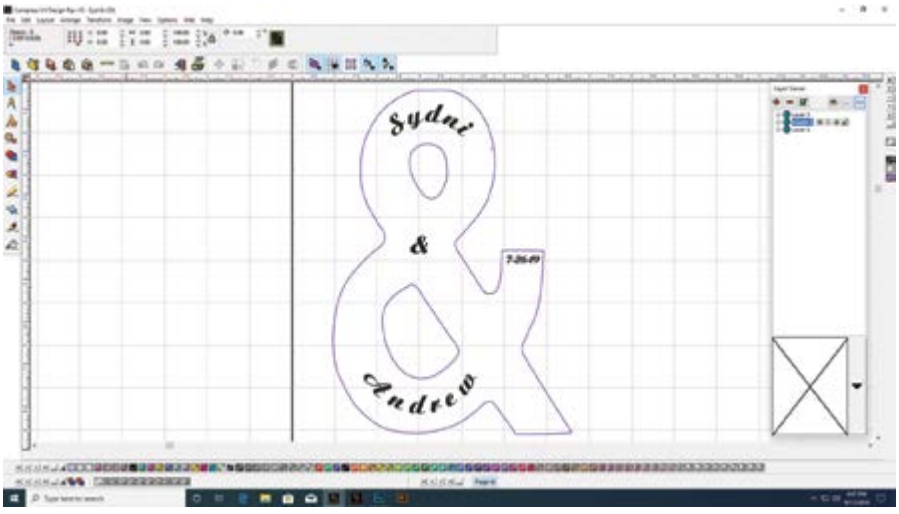
Once the image is printed on the bed, check alignment by placing the item on top of the outline. If you need to make adjustments, do so then reprint until you are happy with the alignment. In our case it was pretty spot-on the first try.

STEP 3

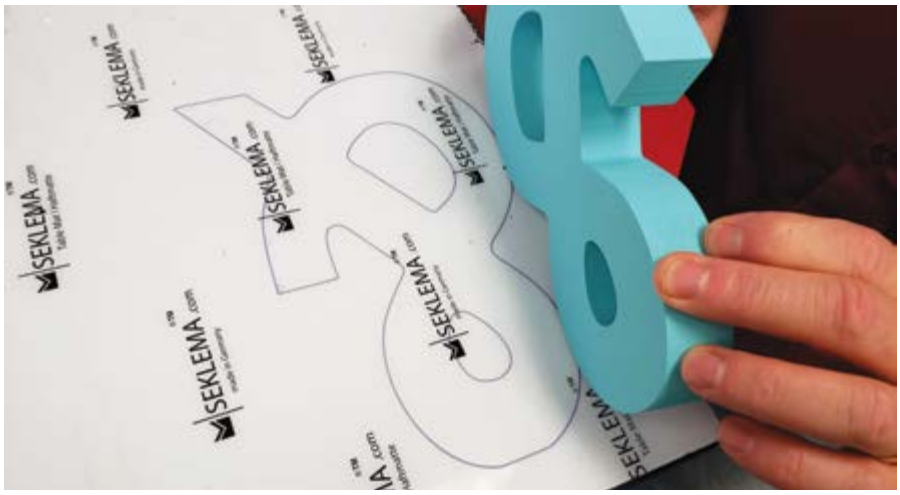
Prepare your graphic to print. Now, to address the graphics for the ampersand. Go back into your design software, create a new layer and place the graphics on that layer



Software view 1



Software view 2 – with arched text



The print on bed

aligned as you want them to print relative to the outline. You can arch text, place graphics, even apply effects like woodgrain etc. at this point.

STEP 4

Test print. When you are happy with your layout you can print the design relative to the page like you did for the outline. This will assure that you are aligned to the outline that you printed onto the bed earlier.

If you want to verify your positioning or layout, simply cover your item with clear, removable vinyl before you print it. If you are happy with positioning and layout then remove the vinyl and print your Etsy store-ready item!

The finished product

STEP 5

Start production! This process can be applied to numerous other difficult items. A recent sample we printed for a potential client (now a client!) was a lid that was basically 3ins x 2.5ins with a printable, raised area roughly ½ins smaller in each direction. We applied the same concept with two vectorized outlines – one for the shape of the item and one for the printable area. We created three layers – the outline for positioning of the lid, the outline for the printable area (which is for positioning of graphics only) and the final layer which was the actual graphics for the lid.

With the staggering growth of Etsy and so many custom cut items that need to be embellished, there is so much opportunity for growth and profit when you can quickly go from cut out shape to printed product. No more need to hand decorate those items!

As we like to tell our UV customers: printing onto difficult shaped items isn't really all that hard. You just need to be a little smarter than the item you are printing on!

You can see the video of the whole process here: https://vimeo.com/348880251 ■

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THE FULL SPECTRUM

3D printing is all about colour, believes Bert Benckhuysen. Here he explains why colour is key to the growth of additive manufacturing

There has been a lot of buzz about 3D printing in recent years. While the 3D printing market continues to expand globally, there is a strong sense in the industry that mass production will be the next big thing. Indeed, additive manufacturing is quickly moving from prototyping into full production, with enhancements in workflow, standardisation and automation underway.

However, at Mimaki we have reasons to expect another scenario to play out in parallel, with the leitmotiv being "What colour you see is what colour you get". In fact, we believe that colour will be key to the growth of additive manufacturing across a number of areas in 2019.

10 MILLION 3D COLOURS

The latest developments in 3D printing technology have achieved full colour capabilities, meaning that additive manufacturing can now produce true-to-life, photo-realistic models. Here Mimaki is a pioneer, thanks to its experience in colour and colour management within the industrial 2D inkjet printing environment.

The new Mimaki 3DUJ-553 is the first ever polymer 3D printing system that enables more than 10 million different full colours. Based on UV-curable inkjet technology, it builds objects by jetting successive layers of inks that are hardened by LED UV light at each pass. 3DUJ-553 uses CMYK, white and clear inks to produce photo-realistic products, with rich colour expression including spot colour, shades and gradients. In addition, the use of white and clear inks enables producing special effects, such as total transparent textures or layered textures with clear on the outside and white or plain colour on the inside and vice versa, boosting opportunities in applications.

The Mimaki 3DUJ-553 uses CMYK, white and clear inks to produce photo-realistic products with rich colour expression, suitable for rapid prototyping

ENHANCED ACCURACY

Well, this is only one side of the story. The other one concerns the support of ICC colour profiles – a world premiere in 3D printing – which is crucial to getting accurate colour simulation and perfect reproducibility from the design screen to the real printed 3D object. Mimaki has drawn on its know-how from 2D printing to bring it to 3D printing: MPM3, a proprietary colour management software, enables colour accuracy, colour adjustments, as well as colour matching among same printer models through equalisation (by measuring colour charts), to allow the same colour output on multiple 3D printers – no matter where in the world they are located.

For further quality benefits, Mimaki has

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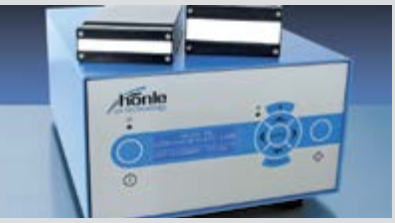


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Mimaki has drawn on its know-how in industrial 2D inkjet printing to ensure the high detail accuracy, colour consistency and production stability of the 3DUJ-553

also introduced an enhanced waveform control system, which adapts the waveform for each ink that is used. You may wonder at the term waveform – what it means is that ink droplets are jetted in near-perfect circles and positioned with absolute precision, resulting in flawless print quality.

So, how will Mimaki's colour-powerful 3DUJ-553 change designers' lives? With its output quality, simulation matching and consistency. The new 3D printing system helps designers ensure that the projects they create on their screens perfectly match the printed output, which broadens up creative opportunities and enables time and cost savings – provided, of course, that screen calibration is done properly! Consistency and repeatability bring in further benefits in terms of cutting out time, cost of transportation and thereby decreasing the environmental impact, as once the project is ready to be printed out, production can run locally with the guarantee that the final products look and feel the same.

BEYOND COLOUR

Colour is not the only strength of our core 3D printing technology. Mimaki's expertise in industrial 2D inkjet printing, as well as in inkjet direct-to-object printing has enabled us to be accurate in every detail of our 3D printing systems.

The 3DUJ-553 is equipped with in-head ink circulation systems, which helps prevent pigment sedimentation and remove air bubbles near the nozzles, and with NCU (Nozzle Check Unit), a nozzle status detection unit that enables automatic cleaning to be performed when a nozzle is missing or damaged. Both the technologies are derived from Mimaki's 2D inkjet printing knowledge and ensure advanced uptime and improved productivity, reliability and production stability also in 3D printing.

Another feature worth mentioning is the modelling area of 500 x 500 x 300mm, which makes the 3DUJ-553 suitable for a wide range of applications, including large-scale prototyping and modelling, with high detail accuracy and efficient positioning of printable objects.

All in all, we expect new frontiers to open up for 3D applications across the coming years. Technology-wise, Mimaki is ready to take up the 3D printing challenges. Application-wise, there are different market segments that can be addressed with the new 3DUJ-553. Ranging from scaled models, mock-ups and prototyping to 3D art, tools and equipment, figurines, as well as medical and educational applications, colour-powerful 3D printing technology is set to enhance the way those industries envision creativity and to improve the overall production process. ■

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SURVEY RESULTS

Marcus Timson and Graham Kennedy report on findings from the Future of Inkjet Survey

Marcus Timson is a director of FM Future

Conducted by FM Future in partnership with Ricoh Europe, the Future of Inkjet Survey was completed by 129 people from across the world. This 'in brief' editorial outlines some of the key themes.

STRONG GROWTH EXPECTATIONS

Confidence in the future growth of industrial inkjet is high; 95% [of those surveyed] are extremely or very confident. Only 1% of respondents do not feel confident. This confidence is useful, as it will be required to overcome technical and commercial challenges necessary for acceptance in conservative manufacturing sectors resistant to disruption and change.

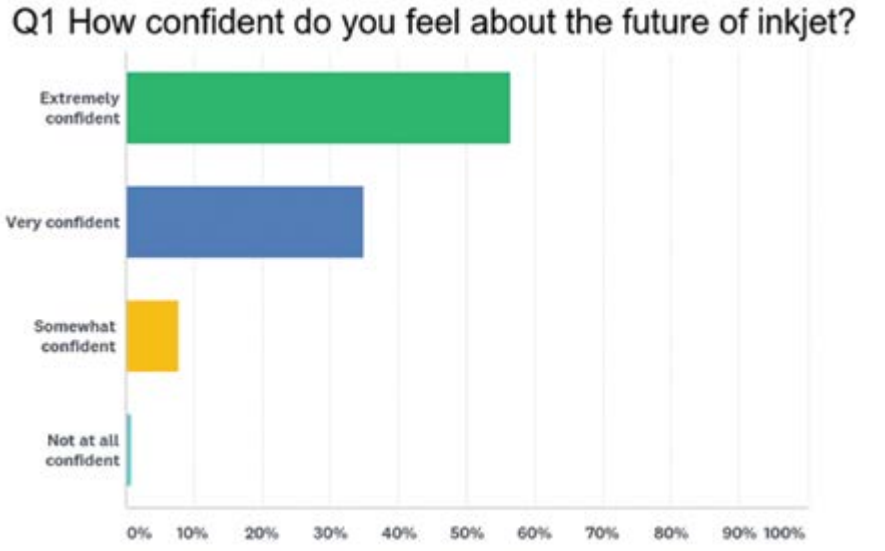
Expected growth for industrial inkjet still outpaces any other market for print and aligns with previous growth expectations; 40% believe growth will exceed 10% for the next 12 months. However, this must be balanced with the fact that respondents mostly came from the inkjet developing and wide format sectors so are therefore familiar with inkjet and invested in its future success.

SPEED AND QUALITY

Mirroring the confidence of the sample of respondents, overwhelmingly (78.1%) of the sample think that the speed and quality issues that confront inkjet in different markets will be met! Only 1.56% believe inkjet would not meet these demands.

NEXT GROWTH MARKETS

Corrugated and folding carton (56%) is considered to be the next application poised to become a significant inkjet market. The number of digital print technology OEMs with inkjet systems designed for this segment underlines this. Secondly, garment (47%) and thirdly décor wall coverings (44%). Additionally, industrial flooring, and decor, in general, continues to be high in growth expectations for inkjet.



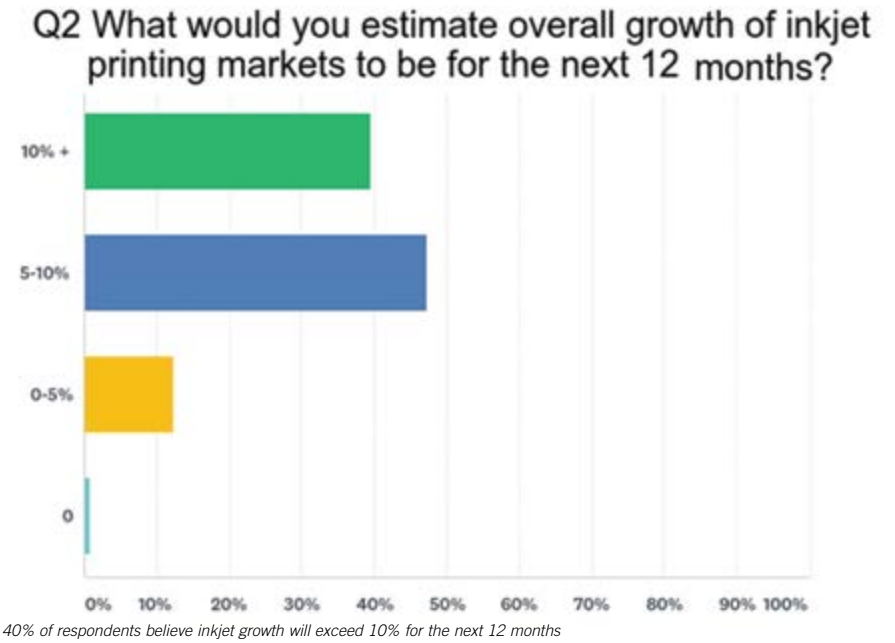
Respondents are invested in the future success of inkjet

CONFLICT AND COLLABORATION

Respondents felt customers (end-manufacturers and tier 1 and 2 suppliers) often get conflicting messages from OEMs and suppliers leading to confusion and misunderstanding. Within the industrial inkjet supply chain, there are many specialist companies that supply components and services and greater collaboration between them would nullify these issues.

TOO FEW INTEGRATORS

Whilst some outstanding companies specialise in integration, respondents felt there was not enough of 'scale' to provide the service the market requires.



40% of respondents believe inkjet growth will exceed 10% for the next 12 months

CHALLENGES PERSIST

Respondents believe technical challenges (50%) are the highest of all, closely followed in second place by the commercial challenges of integrating inkjet into conservative industries (36%). Thirdly, a key challenge to overcome is the lack of confidence from some customers in trying out new technology (35%) in any significant way. This isn't surprising. Since the ceramics tile transformation, the inkjet community has waited expectantly for the next inkjet revolution to occur. This, arguably, is yet to happen, but most just think this is a matter of time until it plays a more significant role in new markets. Most, however, (64%) believe inkjet will play a complementary role and not one that replaces analogue in future markets.

UNDERSTANDING INKJET'S VALUE

Just because inkjet can work in a new market is no guarantee that it will grow quickly. The relatively slow commercial progress of direct to shape inkjet printing is a good example of this. Understanding how inkjet can provide value in a market that has its own unique culture and commercial demands is as much of a factor as solving the technical challenges in our view. And these answers need to come from the inkjet community to make it as easy as possible for new markets to adopt!

EDUCATING MANUFACTURERS AND DESIGNERS

Most (81%) agreed that a key to growth is education. There seems to be a general misperception of what role digital inkjet should play in a production capacity from end-users. Customers often compare inkjet 'like for like' with the output from traditional print. And this can lead to a misunderstanding of its value. The end-users that fully embrace the true capability of inkjet to add agility and flexibility into production will have a greater chance of succeeding.

INKJET MUST TELL A BETTER STORY

Lastly, 61% of respondents felt that the inkjet community is not telling an effective story. If this improved then it would reduce confusion and misunderstanding. To connect with new customers and grow a market that is more conservative or unclear of the economic reasons for adoption, better storytelling and education is needed. This is particularly useful in order to fully exploit the true value of inkjet as a technology that can enhance, complement and add value, as opposed to one that provokes fear in traditional markets that it will disrupt and eventually replace.

The full copy of the report features further analysis and insight from IT Strategies. We also would like to thank our association partner SGIA and our contributors IMI Europe, GIS and Sun Chemical. ■

Marcus Timson is a director of FM Future and Graham Kennedy is Head of Industrial Printing EMEA, Commercial & Industrial Printing Division of Ricoh Europe

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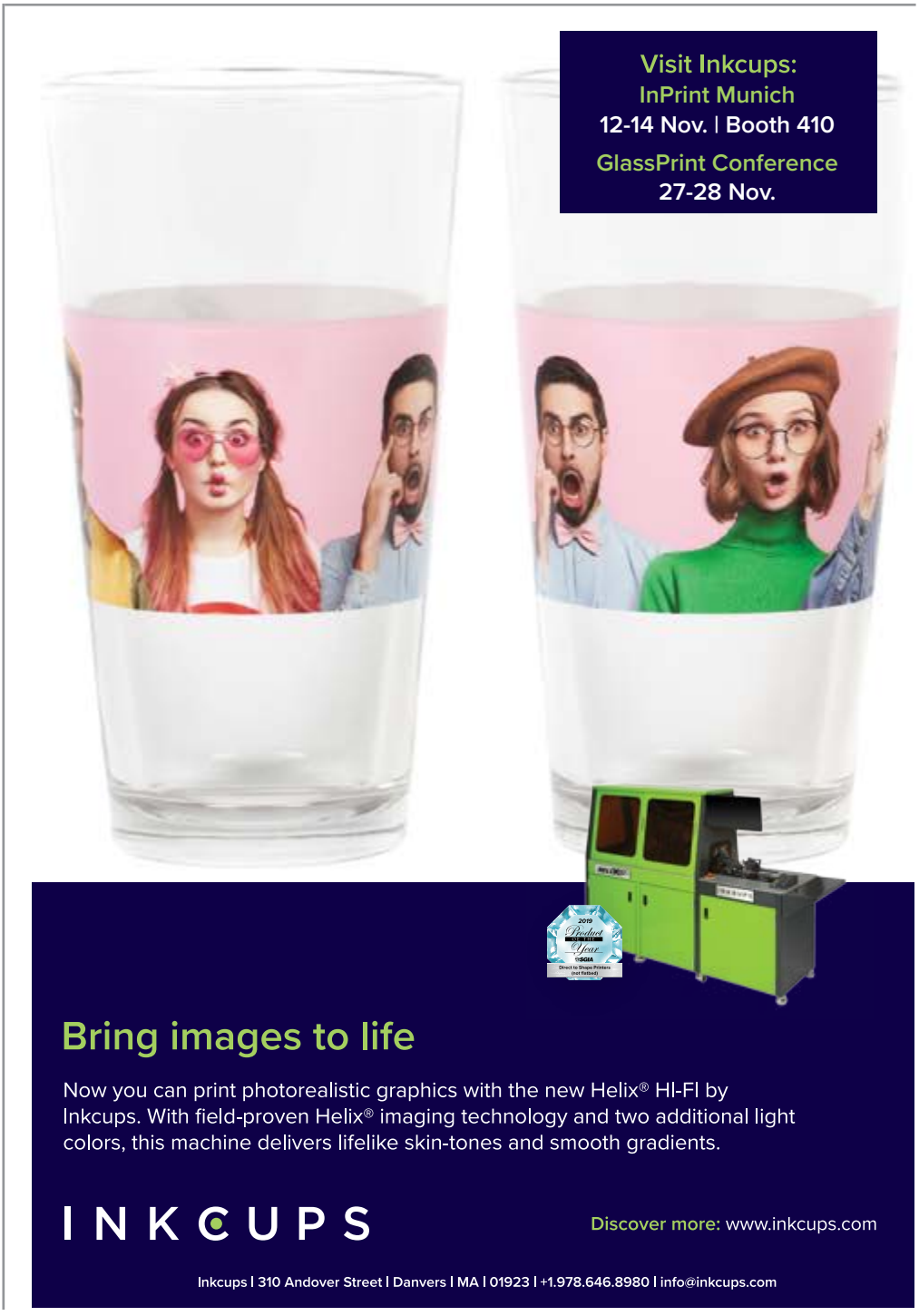

PROOF IS IN THE PUDDING

Ink on film is a lot like pudding, believes Charlie Facini. But a dry surface with a moist centre is a less desirable result when producing screen prints

Cured vs. dried inkjet ink on film. You thought you were a screen printer not a chemist. On inkjet film 'cured' dye ink is denser than 'dried' ink. Curing is a chemical process. When printing film, curing refers to the bonding of the ink to the film media (the emulsion layer).

Recently I read a well-written article discussing the difference between cured and dried ink on press. While it is a topic many printers understand regarding print production on press, the same understanding does not always carry through to the pre-press department, for example. With inkjet film a critical part of successful exposure, you would expect more screen printers would wish to further their learning.

Ink is ink. Although there are different styles used for different purposes, people who work with ink in the world of screen printing should subscribe to a simple rule: cured over dried. What's the difference and why is it important? To answer the 'why' first, it's always important do things correctly. The goal of printing is to produce sharp, clean images that are legible and durable. No-one wants a printed shirt they should not launder for fear the image will wash off; that makes no sense. Doing things correctly results in a print garment that looks great and stands up to many, many washings.

CURED PRESS INK

Screen printers understand they need to run prints through a dryer at a proper time and temperature to allow the ink to 'cure'. The curing process in substrate printing means the ink has gone through an expected procedure that converts it from a more fluid state (wet) to a stronger state (cured) that bonds itself to a substrate or fabric. The result is a cured product. This is good.

DRIED PRESS INK

Dried ink is ink that did NOT fully go through a proper process and thus does not reach a cured state. The top layer becomes 'dry to the touch' but is not dried all the way through from top to bottom leaving it in less than stable state. This is known as dried and will result in an image that breaks down prematurely during normal handling, wear and washing. This is bad.

GETTING TO THE POINT

By now you might be wondering why this article about inkjet filmmaking includes information about textile press inks, well it's because the same understanding applies to your inkjet films. Although we favour inkjet printers because they use no heat, as heat causes films to distort, moving them out of registration, we are still applying ink to these films that need to be cured and not just dried. So, if we are not using heat during the process, how do we cure our inkjet ink? With air, chemistry and time.

Ever have films that did not survive the exposure process? Experience films that tear themselves apart leaving the inkjet ink on the screen after exposure? Sure you have. Here's why that is happening. Inkjet films are polyester carrier sheets coated with an emulsion layer to receive inkjet ink. In most cases, but not always, these coatings are formulated to receive dye ink. In some cases, such as Ulano's PIJF (pigment inkjet film), the purposely-labelled product name is informing the consumer that it is engineered for pigment ink. Dye and pigment ink are very different, therefore using the wrong film and ink combination is a recipe for low quality results, struggles, and waste. We'll discuss this in greater detail later in this article.

Make no mistake, there is no single film with a magic emulsion layer that handles both dye and pigment ink 'equally' well or properly. It handles what it was developed for best. Period. Don't be fooled by those marketing film for dye and pigment. Although the ink will appear on the film and seem dry to the touch, one will yield superior results with cured ink, and one will not.

AIM HIGH

When engineering a RIP for inkjet film printing, it is paramount that software features are created to help the end user achieve their best films. Freehand, for example, offers the powerful Droplet Weight Density Test Print (DWDTP) feature to quickly dial in the perfect amount of ink to be applied to your films for every print. Putting down the right amount will speed up cure time (through evaporation and not heat) while improving density and durability.

With the right amount of ink applied to your film brand the emulsion will not be flooded; the water in the dye will evaporate quickly allowing the dye to fuse to the emulsion layer. Films get denser after they achieve cure and are super durable. These films can be used more than once. Yes, by not curing your inkjet films they likely will not survive the exposure process. The water in the ink reactivates with any remaining moisture from the screen emulsion as well as the heat and pressure from the exposure unit – a recipe for disaster. Make sure your emulsion screens are cured, not just dry before exposing. Residual moisture in the emulsion will destroy your films.

Dye inkjet ink on film is a lot like pudding. It may develop a skin on top that seems dry, but by pushing your finger through it you soon find that the pudding below is still very wet (unstable)

THE PUDDING METAPHOR

Here is an image for you to help remember what you are trying to achieve. Dye inkjet ink on film is a lot like pudding. It may develop a skin on top that seems dry, but by pushing your finger through it, you soon find that the pudding below is still very wet (unstable). On a much thinner level, this is exactly what is happening on your films.

CURE TIME

With the proper amount of ink applied and a properly matched good quality film used, cure rate can happen within minutes and certainly under one hour. Often, depending on the size of the image, the first portion of the film is cured before the last portion has printed. Prints should be able to be stacked up or fall into a catch bin immediately after printing without issue.

CHEMISTRY MATTERS

We all know nothing good comes from mixing the wrong chemicals. So why do so many not care when it comes to film emulsion and ink? Is it because it doesn't explode? Consider this: it explodes into downtime. Do the research at least once, then buy the right products for your business needs, not just what is convenient or cheap. Don't be penny wise and pound-foolish. Use the correct products the right way to save time, money and improve end results.

TELLTALE SIGNS

Start by identifying the proper products. When you have the proper ink-to-film combination the prints are dark, dry and sharp the instant they are printed. Turning the film over, the image looks nearly as black on the backside as the front. Good print.

When a film developed for pigment ink is used with dye inks, the water content in the water-based dye is too much for the emulsion layer on the film. The emulsion layer begins to swell then pull away from the polyester carrier sheet. What do you think fills that gap? You guessed it – the water-based dye ink. Now you have a slow-drying film that is unstable during the exposure process, and worse still: that ink is going to permeate outward. You know this on press as 'dot gain'. Dot gain is defined as the expected or underside movement of ink that might cause an expected or undesirable effect/result. Turn your films over after printing. If the areas immediately behind the 'inked area' are milky white, you are experiencing this issue and it will not fully return to the previous state. What is done is done.

CONCLUSION

Whether you're curing press ink or inkjet ink, just remember that doing things right is not going to slow you down or cost you more money. Issues derived from doing things wrong certainly will. Downtime is our nemesis in a production business in the pre-press or press-production departments. It hurts even more when it's self-inflicted either due to poor planning, lack of knowledge, or rushing through proven processes. Great films make great screens and great screens make great screen prints. Bad films – well, you already know what they make. ■

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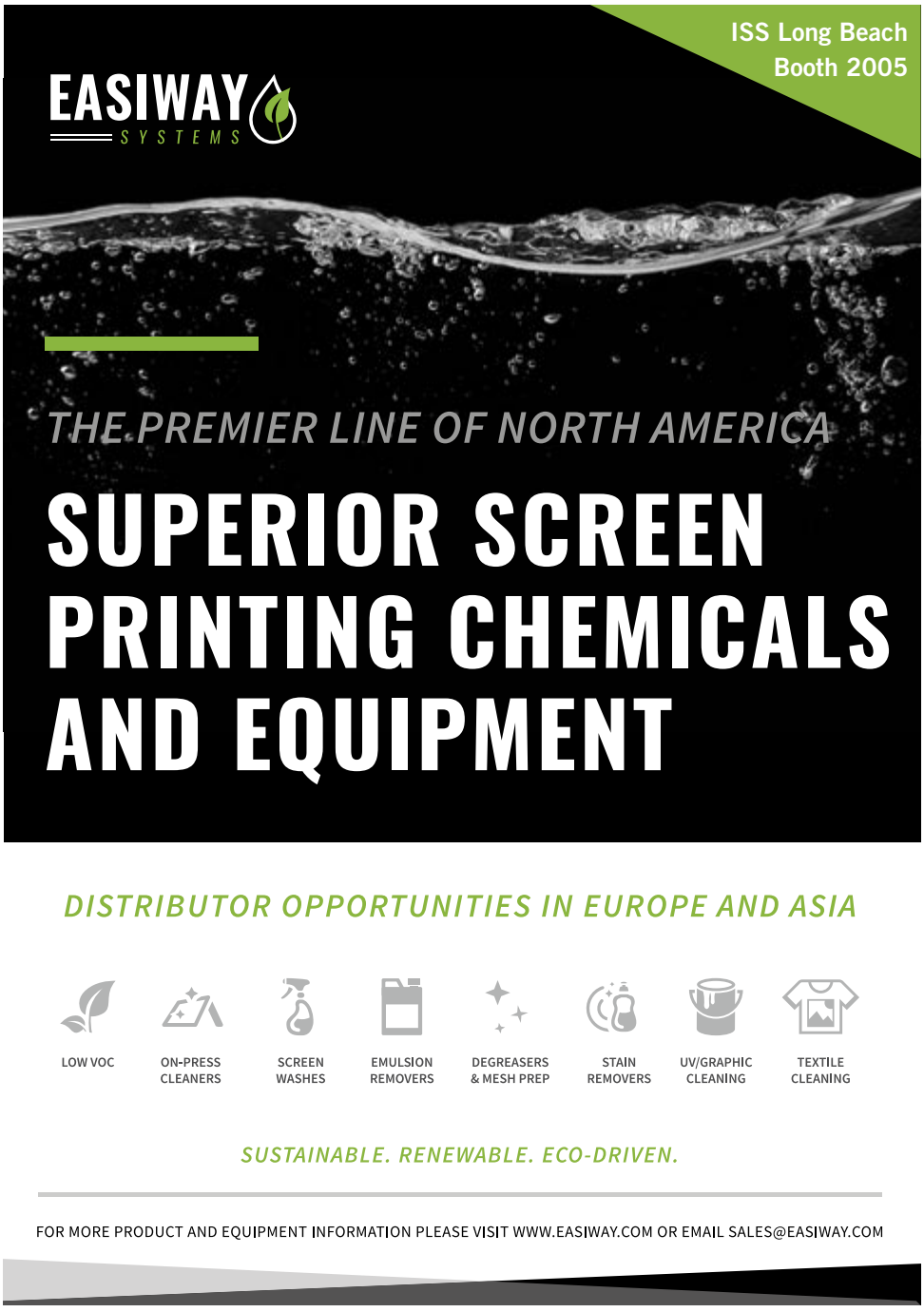

THE FULL GAMUT

Christian Gächter explores the development and advantages of LED-curable outdoor inorganic ink

The CMYK colour model is well-known, even by end-users. Achieving these colours requires the use of organic pigments, meaning there are slight differences from batch to batch and from year to year, as this is a natural resource coming in various qualities – equalising these is the art of ink manufacturing.

Organic pigments are generally derived from plants. Inorganic pigments use chemical formulations to get the desired product properties for various applications. Compounds obtained from inorganic metallic compounds and salts such as chromates, metallic oxides, sulphates etc. are used in inorganic pigments. Organic pigments are based on carbon chains and carbon rings. However, they can also contain metallic (inorganic) elements that help stabilise the properties of the organic component. Inorganic pigments, chemical compounds not based on carbon, are usually metallic salts precipitated from solutions.

In addition, these pigments tend to be sensitive to UV-radiation, leading to limited exposure capabilities in challenged surroundings. One large step to extend this life was made by Austria-based company Tiger Coatings, which introduced its LED-curing Outdoor Organic Ink series with integrated UV-blockers to triple the life of the organic pigments, with the IFO Certificate 14914 according the fulfilment of Exterior Qualideco standards. These inks are suitable for many industrial and graphic long-term applications.

A CHALLENGING IDEA

Already a producer of solvent-based glass decoration ink (which is fused after printing, creating a glass-on-glass layer), Tiger Coatings had the idea of introducing an ink based on inorganic pigments. This ink combines the advantages of the Solvent Glass Ink and the Outdoor Organic Ink in a whole new inkset: The LED-curable Outdoor Inorganic Ink.

Inorganic pigments have remarkably more resistance to the challenges of UV-radiation/sunlight (at least twice that of Outdoor Organic Ink). However, inorganic pigments are more expensive than mass-produced organic pigments; they are more complicated to handle, and also have a limited colour gamut – this is most visible in the reds: instead of magenta, one is forced to use iron-oxide as a reddish, nearly rusty, tone. Cyan is replaced by a more light-blueish tone and yellow is lighter as well. Only black is still the same as carbon is also used in the organic colour set as the black pigment..

Inorganic pigments have more resistance to UV radiation and sunlight

FINE TUNING

The key to success with Solvent Glass Inks is in the milling and balancing the pigment/fluid ratio. Research has led to a solvent ink with remarkably longer shelf life and stability. The pigments need to be able to be milled to the small sizes required by modern printheads; they need to withstand temperatures of 650 degrees to be fused onto glass or ceramics and to bond with the glass frits. Most solvent inks fight with segmentation and have a short shelf life, often leaving clients in despair as colours are not always in constant use and sometimes it is just that small red dot in the lower right corner that gives the most problems... When printing onto inexpensive media, this is a time-robber; when your media is an ESP-glass 2.5m x 5m, this is a severe economic factor.

A COLOURFUL FUTURE

Tiger Coatings' Outdoor Inorganic Inks 'inherited' the pigments of the Solvent Glass Inks as they were widely researched and well-known and cover a large proportion of applications. Excellent adhesion on a wide variety of materials as well as the availability of a sophisticated range of primers and adhesion promoters assures excellent results on countless materials/surfaces, such as wood and stone. Graphic arts applications are 'only' limited by the gamut, so using additional colours is key to cover as much of the CMYK colour space as possible.

In the first version of the new product, green and light pink were used to extend the gamut of the Solvent Glass Ink. Further colours are in development ready to be launched on the market in 2020, and could include a bright orange and a violet. Possible applications include outdoor furniture and flooring, automotive and architectural as well as product branding and coding.

The future for inorganic inks will be even more colourful, and whole new fields of applications are still to be discovered. ■

TIGITAL is a registered trademark of Tiger Coatings

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	TIME	PRESENTATION	PRESENTER
DAY 1 (27 NOVEMBER)	10:00	Arrival, registration and table top exhibition	
	11:00	Introduction and welcome.	Chameleon / ESMA
	11:15	KEYNOTE PRESENTATION	FEVE
	11:45	Digital printing on hollow glass	Fermac
	12:15	Screen print 2.0 from plastic dial to digital glass display	Marabu
	12:45	Lunch and table top exhibition	
	14:00	Inkjet coating and decoration of flat, container and industrial glass	Global Inkjet Systems
	14:30	Adding value for hollow glass decoration	Ferro
	15:00	Adhesion of inkjet inks on glass	ChemStream
	15:30	Coffee break and table top exhibition	
	16:00	Simplifying glass printing with screen and CtS technology	Grünig/SignTronic
	16:30	Direct-to-cylinder: Digital printing on glassware	InkCups
	17:00	KEYNOTE PRESENTATION: German Glass Industry – Situation and Trends.	BV Glas (Bundesverband Glasindustrie)
		KEYNOTE PRESENTATION: glasstec 2020 – current status and future outlook.	glasstec / Messe Düsseldorf
	18:00	Table top exhibition	
	19:00	Networking buffet dinner and table top exhibition	
	21:00	Close	
DAY 2 (28 NOVEMBER)	08:00	Table top exhibition	
	08:55	Welcome to day two	Chameleon / ESMA
	09:00	KEYNOTE PRESENTATION	Glass for Europe
	09:30	Surface pre-treatment to enhance adhesion and coverage of organic inks to hollow glass	Tecno5, an affiliate of Cerve
	10:00	High performance CTP system for digital preparation of silk screen forms and pad printing plates	Lüscher
	10:30	Coffee break and table top exhibition	
	11:00	Developing dedicated mesh for screenprinting on glass	Sefar
	11:30	Will it be screen or digital printing on glass bottles?	Curvink
	12:00	Industrial solution for digital printing of windshields and sidelights	THIEME
	12:30	Lunch and table top exhibition	
	13:30	Making a lasting impression: Ink adhesion to glass	Oliver Kammann, ESMA Expert
	14:00	Automation and control for screen printing on small size flat glass	SPS Technoscreen
	14:30	Labels are out! Ink challenges and opportunities in direct to container glass inkjet printing	Marabu
	15:00	Sol-gel inkjet printing for transparent conductors on glass	COMATEC-LANS
	15:30	Table top exhibtion	
	16:30	Close	

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PLASTIC FANTASTIC

Curt Baskin and John Schneiderhan look at the challenges involved in meeting the demands for laminated and credit card printing

Credit card companies, banks, retailers, and hotels are just some of the brand owners that make a sizeable investment in the manufacture of credit cards and plastic cards. Retail brands today use everything from loyalty cards, rewards cards, point cards, club cards and other inducements to reward buyers for sticking with their brand.

The plastic card industry also extends to companies that take the time to develop secure identification cards for employees to ensure safety in the workplace. In all cases, companies, brands and retailers want the plastic cards they manufacture to maintain brand standards and colours.

According to the April and October 2018 Nilson Reports, 20.48 billion payment cards were in circulation worldwide with 295.65 billion purchase transactions at merchants in 2017. The key challenge that all of these industries are facing is security. Credit and debit card fraud resulted in losses of $24.26 billion in 2017 according to the November 2018 Nilson Report.

Brand owners depend on plastic cards to be a key source of revenue and brand loyalty, but at the same time, they are required to keep the consumer data stored in each card safe and protected from potential fraud. Some of the requirements card manufacturers are looking for during the printing process include:

- Strong adhesion properties of inks and coatings to the PVC core material
- Lamination properties that provide strong bond strength and pass ISO specifications
- Inks that cure fast and maintain colour consistency with brand standards
- Flexibility to allow for drilling, cutting, and embossing without chipping or cracking the card
- Ability to add brand protections solutions to the cards
- Good lithography performance on printed cards with minimal tacking and blanket swelling.

KEY REQUIREMENTS OF INKS AND COATINGS

Printers and brand owners alike need inks and coatings that easily adhere to all types of plastic and lamination substrates while at the same time maintaining durability. The final printed lamination properties in today's marketplace must pass ISO specifications with a minimum 3.5 N/cm bond strength. Brand owners are pushing for higher bond strength – as much as 5.0 N/cm bond strength.

Plastic cards must be durable, both during the printing process and when in people's purses or pockets. The inks and coatings that are printed on plastic cards must be flexible, allowing for drilling, cutting and embossing, without the inks chipping or cracking during the card manufacturing process.

Plastic cards can also endure significant abuse after they are printed. Vinyl pouches in people's wallets, for example, have been known to penetrate a card surface and extract the inks/dyes used to print photos and other images. That doesn't include all the skin oils and cosmetics, gasoline and leather treatment chemicals that could wear down the card's surface.

Repeated swipes through a card reader can remove features from the card. Moisture, light and de-lamination are all other factors that could affect the durability of the inks on a card.

Inks, such as Sun Chemical's SunCarte family of screen and offset inks, adhesives and varnishes, must be formulated for robust lithographic performance and durability while offering high bond strength that meets the

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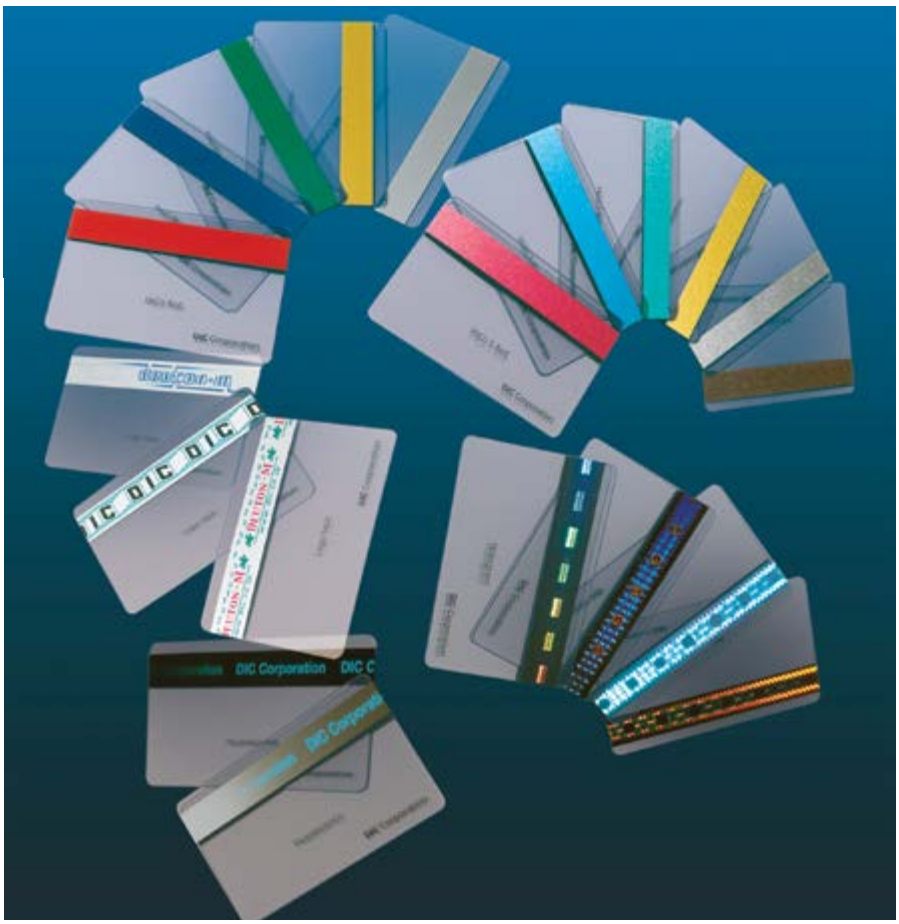
20.48 billion payment cards were in circulation worldwide in 2018



Customised colours can be developed for magnetic tapes

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demanding ISO specifications, as well as adherence to lamination and other plastic substrates used in the plastic card industry, including: PVC, PETg, PET, and polycarbonate (PC) core materials. Inks also need to deliver excellent printability, low dot gain, and heat resistant colours.

Many brand owners and printers aim for card designs with their own special touch. A quality set of inks can usually be customised to deliver various metallic finishes. Opaque white inks can be designed to work on coloured PVC core materials, while other inks can be used to provide pearl, silver, gold and other special effect colour finishes.

COLOUR CONSISTENCY

Brand owners and card printers alike want the right colour printed the first time, every time and anywhere at the most economic delivered price possible. Ink manufacturers sometimes offer colour management solutions to help achieve colour consistency on press.

For Sun Chemical's part, the company offers its Sun Chemical Dispenser Program, which is designed to help manage what has typically resulted in an overabundance of spot colour inventory and to reduce the possibility of using the wrong spot colour.

By using the program, printers can mix their own spot and process colours in the precise quantities they need, thus reducing inventory costs and improving colour accuracy.

MAGNETIC TAPE OPTIONS

With the continued growth of loyalty and membership programs, brands are making lamination cards that are much more sophisticated in design. Sometimes they even require magnetic tapes to come in different colours and styles.

Issuers, such as banks and retailers, can also promote their brand image by taking advantage of the magnetic tape space by employing either a special colour match or printing. This enlivens this dead space by further enhancing the brand.

Magnetic tapes can offer high quality and low noise. Through Sun Chemical's parent company, the DIC Corporation, magnetic tapes typically come in five standard colours (red, blue, green, gold and silver), and six sparkling colours which includes black in addition to the standard colours. Customised colours can also be developed. Another option can be to add visual information, such as the corporate name, URL, telephone number, etc. onto the magnetic strip.

Brand protection and security features can also be added to the magnetic tape, including a fluorescent hidden image that can be seen under a black light, or holographic silver and black type. Customised colours to match brand standards can be created as per customer specifications.

Choosing a magnetic strip that offers a strong top coat layer is important. This surface provides extra protection to not only shield the magnetic surface, but also maintains the vibrancy of the colour and printing throughout the life of the card. Magnetic tapes should come with an over printing layer to protect the magnetic layer from abrasion against the magnetic head of the card reader and must be designed to meet the stringent specifications required for the lamination process.

SECURITY FEATURES

ID and credit card fraud have led to the need for increased card security. This has resulted in sophisticated credentials that feature layers of visual, physical and digital security as a way to protect employees, citizens of nations and people's money.

Plastic cards must be durable, both during the printing process and when in use

Sun Chemical's Dispenser Program allows printers to mix their own spot and process colours in the precise quantities they need

Using a wide array of overt and covert brand protection solutions can help governments and brands with strategy formulation, contingency planning, chain of custody framework and other components to ensure the integrity of ID cards. For example, Sun Chemical, through its joint venture with 4Plate, can further increase the security on the surface of cards through engraved lamination plates.

ID cards can also benefit from added security features, such as laser engravable embedded holograms that are pre-applied on a PC overlay and ready for the card lamination process. While not a common process, the pre-application of holograms on the PC overlay offer excellent anti forgery solutions for the protection of personal data on ID cards, passports and driving licenses.

Credit card companies are also increasing the security of their credit cards through EMV technology. A variety of electronic materials options are available from ink manufacturers, like Sun Chemical, for this important space, including printed antenna and metallisations for interconnect, as well as advanced material, such as jet table nano silver, palladium, and gold to support the chip. ■

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FULL SPEED AHEAD

Tracey Brown and David Heath explain how recent advances in printhead drive electronics and software can dramatically improve print quality in high-speed, single-pass inkjet applications

From the exceptional print quality requirements of commercial labels to the non-contact robustness needed for ceramic tile decoration, to the precision deposition capability demanded by printed electronics, adoption of inkjet technology in industrial environments continues to expand and amaze. Years of focused development have yielded highly reliable printheads which work with an unending stream of fluids but jetting, by its nature, will always present some level of challenge.

To date, most industrial inkjet printers are scanning systems where multiple passes of the printhead mask common jetting issues, usually at the expense of throughput. Recent advances in electronics and software are fuelling growth in single-pass systems, paving the way for speeds and print quality which approach the best analogue print technologies.

COMMON JETTING ISSUES

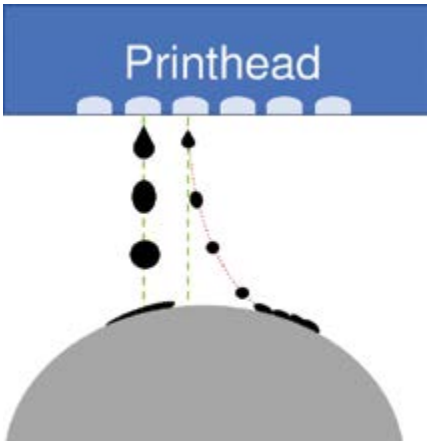
Jetting issues generally fall into four categories: satellites, inter-printhead banding, jet deviation and missing nozzles.

Satellites are undesired drops which are separate from the main drop. Not to be confused with droplets intentionally created by grey-scale printheads, satellites are a nuisance, causing fluid to land in the wrong place on the substrate or in the environment. Satellites can be caused during drop formation by suboptimal printhead waveforms, excessive drive voltage or, most commonly, by low ink surface tension. Often satellites are smaller than the main drop causing them to respond differently to air currents or static charge on the substrate.

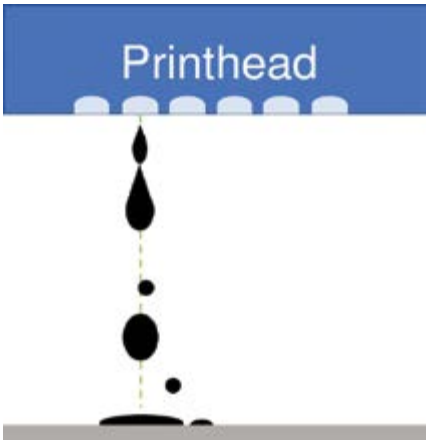
Inter-printhead banding, commonly known as 'smile' or 'frown,' is due to the edge or middle of a printhead ejecting stronger (darker) drops than the rest of the head. Manufacturers modify printhead designs to ameliorate the effect, but this problem continues to plague all printhead types.

Jet deviation can have any number of causes including debris or cured fluid on the printhead faceplate, air trapped in the nozzles, incorrect faceplate wetting or even a build-up of ink mist on the faceplate. The straighter and faster the jet, the better the drop placement accuracy. Non-flat or uneven surfaces present special challenges, especially in grey-scale printing where drops vary in size.

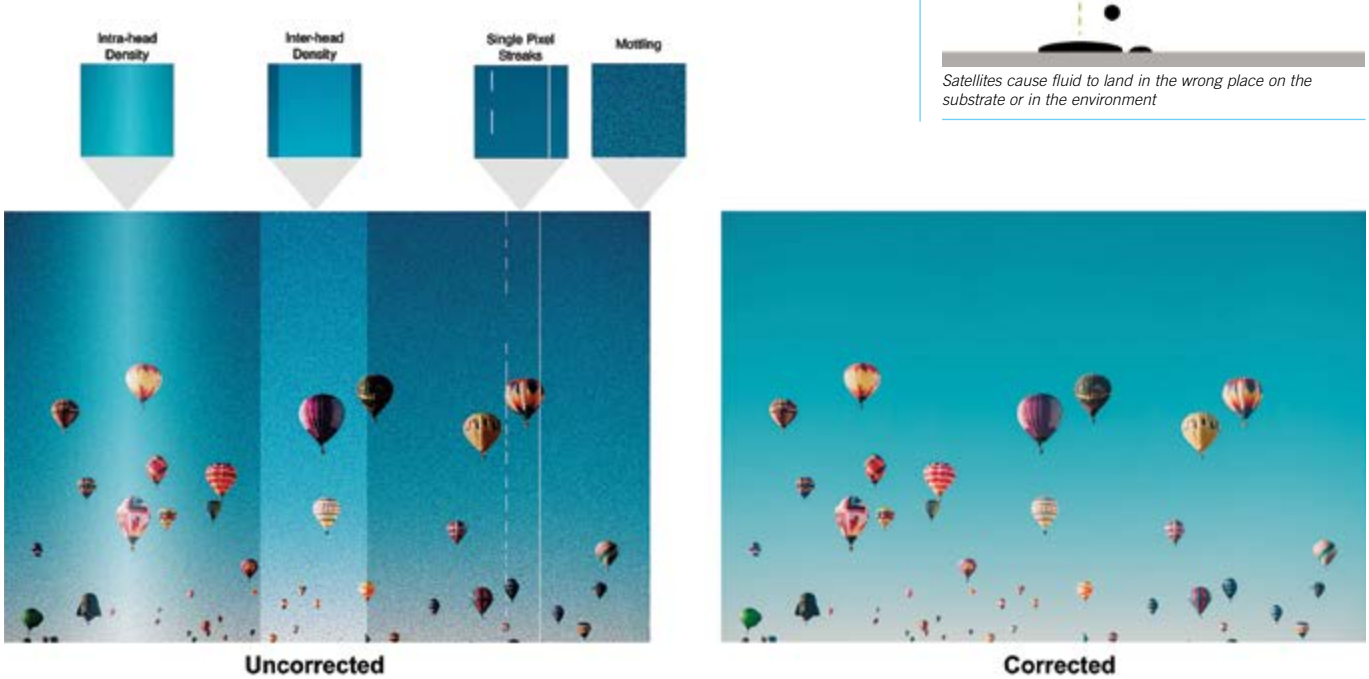
Missing nozzles can occur at the onset of printing or they can develop over time. Causes include fluid starvation (due to a blocked filter or insufficient flow through a recirculating printhead), trapped air within nozzles, debris or cured fluid within nozzles, damaged printheads, incorrect meniscus pressure or a sub-optimal printhead waveform. The impact of missing nozzles is greater for single-pass systems.



Jet deviation is caused by debris or cured fluid on the printhead faceplate, air trapped in the nozzles, incorrect faceplate wetting or even a build-up of ink mist on the faceplate



Satellites cause fluid to land in the wrong place on the substrate or in the environment



Simulated effect of print quality correction

CONVENTIONAL SOLUTIONS

Once a jetting reliability problem is identified (often no easy task), the solution may be obvious, although sometimes tricky to implement. Satellite problems can be eliminated through careful printhead waveform design. Drop placement inaccuracies exacerbated by large or varying throw distances might benefit from the adjustment of print timing or the tweaking of image data. Well-executed printhead maintenance procedures coupled with clever tricks such as the utilisation of electronic tickle pulses to keep fluid in motion can help to alleviate jet deviation problems. And there are as many techniques for recovering missing nozzles as there are causes. These include addressing issues of fluid starvation with plumbing modifications or ink delivery system adjustment, implementing priming and spitting processes to help with clearing trapped air or debris within nozzles and the creation of special waveforms to discourage de-priming.

THE FUTURE IS NOW

Conventional solutions to common jetting issues are often sufficient for scanning printers but the mitigating effect of multiple passes is unavailable to single-pass systems. For single-pass systems operating at high speed, problems might not be caught before significant output is ruined. Ideally, whether a system is scanning or single-pass, problems should be automatically detected and fixed on-the-fly. Fortunately, imaginative new hardware and software techniques are emerging both to detect and correct print quality issues in near real-time.

The use of cameras or other optical sensors to detect failed nozzles is not new. This technique is extremely effective at spotting small non-uniformities, even at high speeds but because of expense and complexity, implementation is typically reserved for very large systems. A promising and much less expensive method to detect nozzle problems is currently in the research stage. This method uses printhead nozzle status feedback obtained via the electrical interface to the piezo drivers to identify problems at very high speed and automatically apply real-time corrections.

There are also recent breakthroughs in print quality correction. PrintFlat by Global Graphics Software is a powerful technique that involves creating unique, printer-specific screens as a part of a print calibration process. These screens can then be applied to image data while still in the electronic datapath, thus compensating for varying print densities due to any number of physical causes. Advantages include density-based same plane compensation for stitching errors, some windage effects, and those inter-printhead 'smile' and 'frown' effects for which there is no other solution in single-pass printing.

Another example of a commercially available compensation technology is NozzleFix by Meteor Inkjet. This technology uses good jetting nozzles to mask nearby deviated or missing nozzles. When poorly performing nozzles are detected, they are switched off and the datapath then employs two compensation methods to recover. Same-plane compensation applies extra fluid from nearby nozzles which are in the same colour plane as the disabled nozzle. Inter-plane compensation applies extra fluid from nearby nozzles which are on different colour planes or an interlaced same colour plane.

The benefit of these new techniques can be quite striking. Recent implementations include high-speed, single-pass label, textile ceramic and book printers. Achieving exceptional print quality in demanding single-pass applications is more than just an aspiration; it is now reality and the rewards are immense. ■

Tracey Brown is Director of Strategy & Marketing and David Heath is Technical Sales & Marketing Manager at Meteor Inkjet

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SIMPLY THE BEST

Joe Becker examines the key factors for ensuring optimal UV LED curing of inks, coatings and adhesives

When evaluating features for UV LED curing systems, it's often unclear which of the many metrics and benchmarks are the most important selection criteria. Two fundamental parameters to focus on are peak irradiance (measured in watts per cm²) and energy density (measured in Joules per cm²). But that's not all...

WHAT IS AN LED?

An LED is a solid-state device created from semiconductor material. On the surface, light emitting diodes (LEDs) may look the same. That visual similarity doesn't mean they all perform the same. They don't.

LEDs are a silicon technology so no two LEDs are the same. From LED to LED the variation can range from the wavelength of the light they produce to the power they emit (watts).

LED UV lights emit a narrow spectral output centred on a specific wavelength, +/- 10nm. This near-monochromatic distribution (see **Figure 1**) requires tailored chemical formulations to ensure proper curing of inks, coatings, and adhesives.

Having high-quality and consistent LED performance is critical. The lamp curing system plays a critical role in ensuring these key deliverables. By using raw LEDs, Phoseon can select LEDs with similar performance levels that need the least amount of current to produce the desired power level. This ensures uniform, consistent performance and long life expectancy across an array of LEDs.

RAW VS PACKAGED LED

An increasing number of manufacturers are embracing UV LED due to its numerous benefits, including the ability to generate higher yields, reduced scrap, lower running and maintenance costs, and precision control. Furthermore, the UV output from high quality LED curing systems remains consistent over the life of the device and provides a more uniform result than arc and microwave lamps.

Although LEDs may look the same, their performance can vary

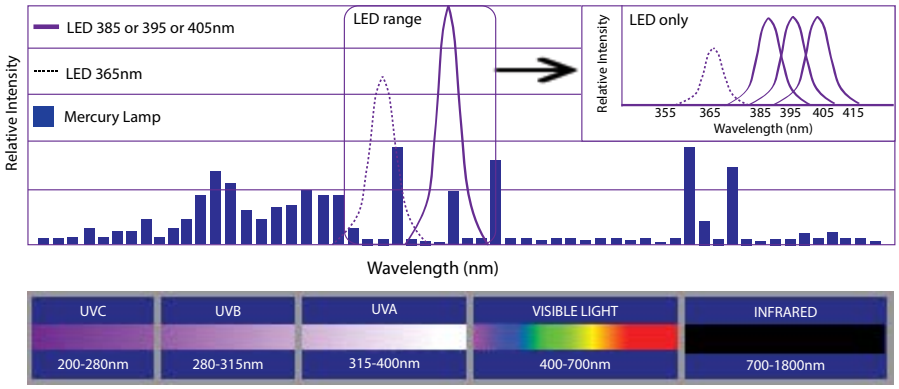
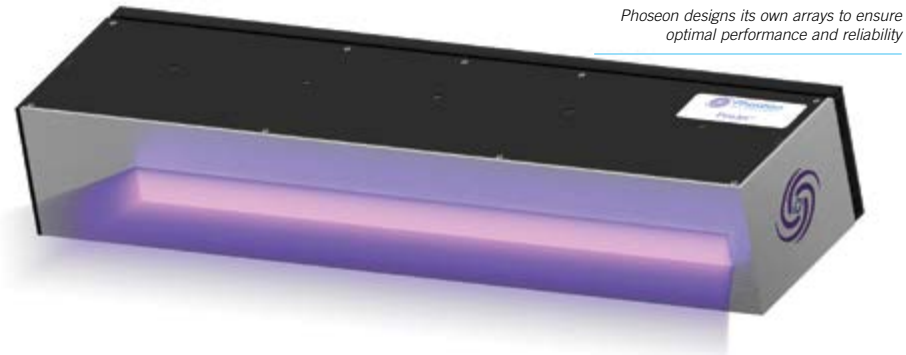


Figure 1: LED UV lights emit a narrow spectral output centred on a specific wavelength

That means tighter process control, less downtime, greater plant utilisation and an overall better and more consistent product.

By purchasing 'raw' LEDS from the manufacturer, which sorts the LEDs and put them in bins based on performance, Phoseon can choose the size and performance level of LEDs it wants, carefully selecting LEDS with similar characteristics. While no two LEDs are the same, the company chooses LEDs that are most optimal – requiring the least amount of energy to get the most power and longest life – with the least amount of performance variance.

With packaged LEDs, there is no way to know the quality of the LEDs or how much variance exists between them, so Phoseon designs its own arrays to ensure optimal performance and reliability.



Phoseon designs its own arrays to ensure optimal performance and reliability

SLM TECHNOLOGY

LEDs are not operated alone; they need to be mounted on a substrate, and arranged in a grouping or cluster called an array. The number and type of LEDs chosen, the arrangement of the array, the method of electrically connecting the LEDs, and LED cooling technology have significant impact on the performance of the system. All these factors make up Phoseon's patented Semiconductor Light Matrix (SLM) technology.

Depending on the type of curing system, Phoseon mounts the SLM array on an air- or

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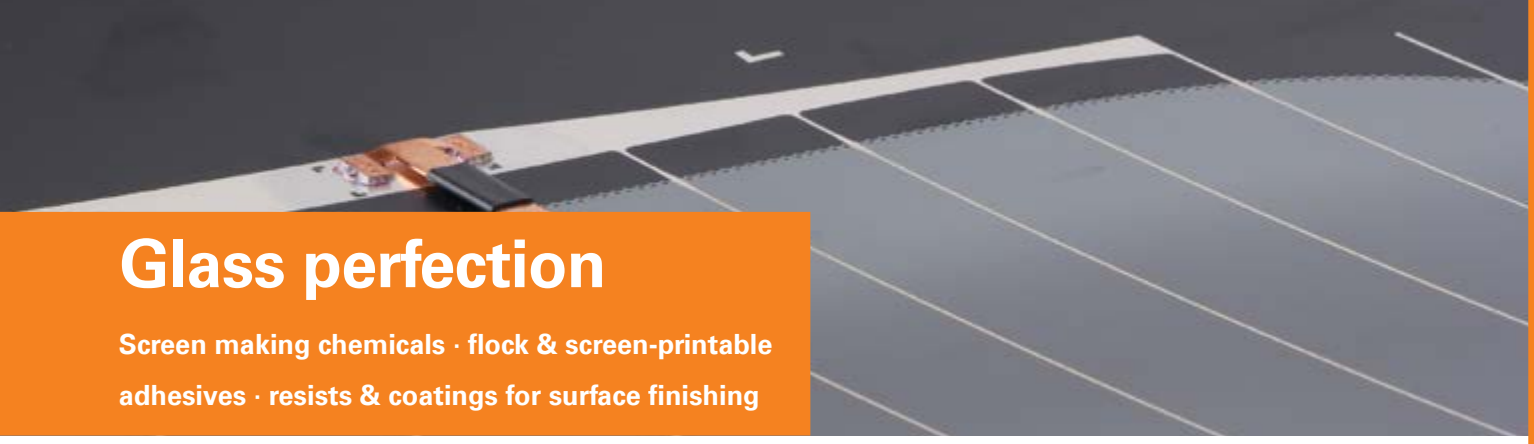

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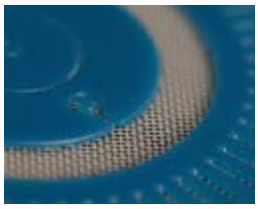

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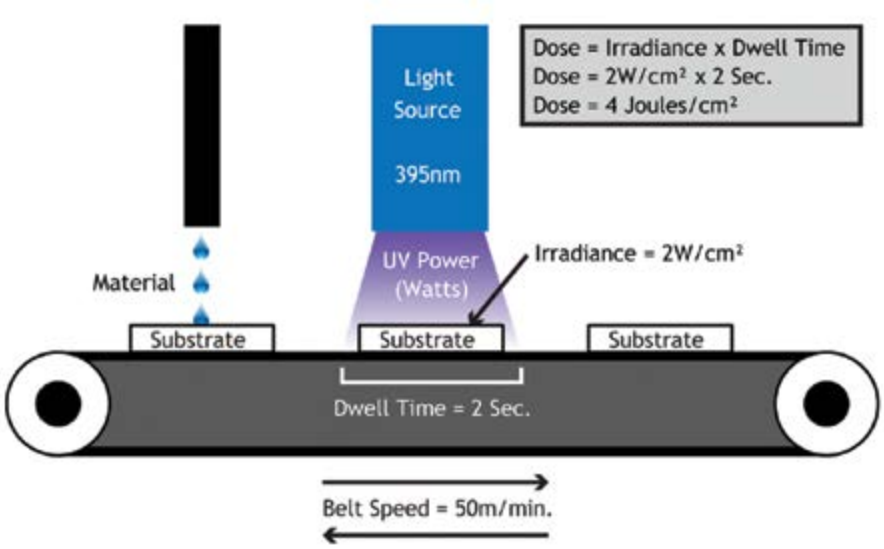

Figure 2: On fast-moving presses, the UV dose needed for full UV curing must be delivered in fractions of seconds; to attain a full cure with PWM-based lamps would require reducing belt speeds, and therefore throughput

liquid-cooled heat sink, which pulls heat away from the substrate. Ensuring its substrate material is flat and tightly adhered to the heat sink enables quick, even heat dissipation and the highest power output. Phoseon's UV LED curing systems emit peak irradiance up to 25 watts/cm² for air-cooled heads and 30 watts/cm² for liquid-cooled heads.

That may seem like Phoseon goes to great lengths to design and produce an UV LED curing technology. It does. Phoseon builds complete light engines, within its ISO 2015 facility, from individual diodes rather than using pre-packaged LEDs. This allows it to match individual LED characteristics with other components to maximise the total UV energy.

HOW PWM IMPACTS PEAK IRRADIANCE

Pulse width modulation (PWM) techniques can be used to induce higher intensities of UV light from LED lamps. However, these higher UV irradiance levels using PWM can come with trade-offs in energy density and product life.

PWM is a method of adjusting the level of power delivered from an electrical signal by effectively dividing the current flow into a series of discrete elements. In other words, PWM creates an on-off, on-off pattern that simulates voltages between full on and full off by changing the portion of the time the signal spends 'on' versus the time that the signal spends 'off.'

When PWM is employed in an LED lighting system, the power to the light source turns on and off at a very fast rate, usually so quickly that the human eye can't register the intervals. This is one method used for 'dimming' LED household lights: as the duty cycle grows shorter, the LED light seems to dim. In fact, the LED is emitting less light during any time period because the lamp is off more than it is on.

PWM is used in UV LED curing solutions to effect two principal outcomes. PWM can be used as a method of cooling the UV LED array, as the on-off switching of the lamps decreases the overall heat generated by the lamps, as for some fractional part of the time, the lamps will be off.

PWM can also be used for boosting light intensities of LED lamps beyond rated levels. As noted previously, a key metric for evaluating the performance of a UV LED curing solution is the system's peak irradiance levels. However, higher irradiance is reached by increasing power levels to the LEDs, which also increases the heat generated by the lamps and reduces the useful life of the LED diode.

In addition, PWM lowers energy dose. To achieve optimal UV curing, the coated surface must receive a sufficient dose of UV energy (see **Figure 2**). However, if the light source for the UV dose is intermittently off and not delivering UV energy, the surface may not absorb enough UV density for curing despite elevated irradiance levels. Without sufficient UV dose, the curing will be incomplete or flawed, leading to suboptimal results, lower yields and increased scrap.

UV LED lamps are commonly used for curing inks in flexographic printing processes, because the UV LEDs are very efficient at drying inks while running presses at high speeds. If printed media passes below a PWM-based lamp during one of the intervals when the lamp is off, the media will roll off the presses with uncured areas in its surface.

PRODUCT LIFE

Two major factors that affect the lifetime of LEDs are temperature and current with PWM. As LEDs convert electricity into light, heat is created within the p-n junction, known as the junction temperature. For an LED diode to achieve maximum life expectancy, the junction temperature has to remain in a safe operating zone.

Pushing LEDs to attain higher peak irradiance can impact the LEDs' life expectancy, because subjecting the LED to operating conditions outside of its specifications can lead to premature LED failure. Some lamp suppliers achieve their stated high-output irradiance by over-charging their diodes. Although this may increase the light output for a short amount of time, prolonged use at this level of irradiance will shorten the LED's lifetime, even with efficient cooling. Unfortunately for the customer, this failure will only show up after they have purchased the inferior product and then experience curing issues.

UV LED TECHNOLOGY ADVANTAGE

When using UV LED light energy to cure inks, coatings and adhesives on everything from paper to furniture, having high-quality and consistent LED performance is critical. UV LED curing solutions are designed to deliver reliable, linear power at a steady-state of UV output without using PWM techniques that push lamps to attain unsustainably high levels of irradiance. Steady-current Phoseon UV LEDs deliver consistent but highly controllable levels of UV light that provide optimal energy to drive the appropriate UV LED curing performance for a diverse range of applications. Patented thermal management techniques, including air- or liquid-cooled heat sinks, can remove excess heat from the system while providing a consistent operating temperature for the diodes to function at maximum performance over their operating lifetime.

Phoseon has been performing actual life testing with light sources for many years. Our longest lasting lamp to-date reached over 70,000 hours (8 years!) of constant on time.

Phoseon assembles its systems in a semiconductor-based clean-room environment, and manufacturing engineers are intimately involved with the product design starting with new product development, through initial production, and then into sustaining. Advanced automation, burn-in, and statistical quality control (SQC) throughout manufacturing process are critical.

With all these variables, finding the right UV LED curing technology to produce the proper peak irradiance and energy density for your specific curing application may seem complicated, but Phoseon has decades of experience matching the correct UV curing solution to the needs of the application. ■

Joe Becker is Product Marketing Engineer at Phoseon Technologies

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EMBRACING CHANGE

Celebrating its 70th anniversary, this company continues to push forwards with new technology and collaborations

ESC is a global enterprise with core competencies in the fields of screen, digital and pad printing and in designing customised screen printing solutions for industrial applications. Located today in Stietencron castle in Bad Salzuflen, the company was founded in 1949 in Hamburg by screen printing pioneer Rudolf Trebbow, with the aim of producing screen stencils for the furniture industry.

During the 1960s personal screen printing machines were developed for graphics as well as the first industrial applications and in 1968 Ulrich Borghoff, the father of ESC's owner, started to lead the company. In the 1970s the programme was enlarged by the PERFECTA systems for environmental protection. During this period the company moved to headquarters at Heldmanstrasse and established its first permanent exhibition of screen printing machines – it turned out that customers wanted to see the machines in action as part of the purchasing process. ESC's first screen printing seminars and training courses were also taking place. The subsidiary company EZC Europa-Zeefdruk-Centrum B.V. was founded in the Netherlands city of Eindhoven.

In the period that followed, printing demands were constantly increasing. ESC enlarged its exhibition area to 5,000m² and also increased its stock to supply by ATMA universal screen printers, COMEC pad printing machines for printing of prefabricated parts for graphic or industrial applications, all-automatic inline screen cleaning equipment, cylinder screen printing systems with corresponding dryers, all-automatic printing lines and complete peripheral equipment. The enterprise became a full service provider with worldwide operations.

The ESC company site at Bad Salzuflen in Germany

SCREEN PRINTING SOLUTIONS

During recent years screen printing technology has become a crucial solution to fulfil complex printing tasks within the industrial manufacturing process. Drawing on its long-term experience and technical expertise, ESC's emphasis is on designing and realising all-automatic printing or coating solutions in close co-operation with the customers. Such solutions can be the printing and coating of cylinder head gaskets or gear plates, or the printing of PMA panels – in the automotive industry, as well as white goods production, architecture or home design, flexibility is a matter of priority. The main advantage of these systems is the combination of different technologies, such as robot systems and the latest UV and K-NIR drying units with screen printers including state-of-the-art production monitoring.

A Sakurai Maestro MS-102SD all-automatic stop cylinder screen printing machine

ESC AND SAKURAI

Furthermore, many surface-sensitive materials like films for electric, electron, motor vehicle and other products require sharp and high-quality images in combination with a high output. That is why ESC is now joining forces with Sakurai in the German speaking market and will be selling the complete range of swing and stop cylinder systems from this manufacturer. The latest enhancement of the Sakurai Maestro stop cylinder series is the SD-version with servo drive motors. This enables separate movements of printing cylinder, master frame and squeegee and flood coater which lead to precise adaption to very special printing requirements. The result is an even ink layer on the substrate. Automatic, optical sheet alignment, squeegee impression and speed control with digital display are also part of the standard equipment which can be extended by various devices like CCD camera systems for sheet alignment and screen frame adjustment or Sakurai Smart Factory production data acquisition system.

Even 70 years after its foundation, one company aim still remains valid: ESC will continue to go in innovative and new technical directions. ■

Marcus Borghoff is General Manager of ESC Europa-Siebdruckmaschinen-Centrum

Further information:
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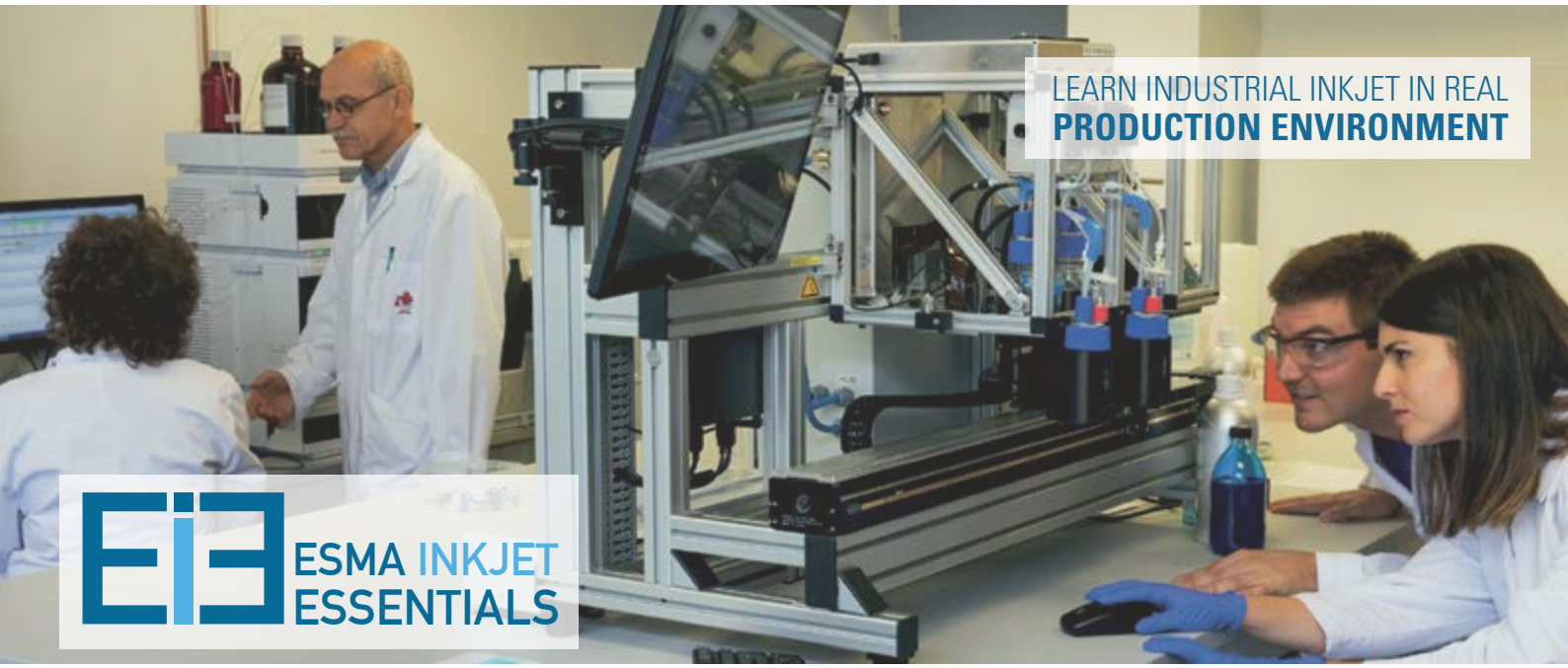

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Kornit helps Spreadshirt to meet increased demand

Spreadshirt, a global on-demand apparel brand that prints more than 5.5 million items annually has purchased Kornit Atlas direct-to-garment systems to be installed at multiple sites internationally. The Atlas is a high-capacity system, designed to deliver typical annual production capacity of up to 350,000 impressions, optimising production efficiency and cost of ownership.

In addition, Spreadshirt has been testing the Kornit Avalanche Poly Pro, as it plans to expand business into the sports and athleisure segments. The Kornit Avalanche Poly Pro is the industry's first digital, industrial process for high-quality printing on polyester, preventing dye-migration. The solution is based on Kornit's patented NeoPoly Technology.

Hanne Dinkel, Chief Customer Delivery Officer of Spreadshirt, commented, "Quality and customer satisfaction have top priority at Spreadshirt. With the significant investment we are making in new technologies and machines, we will not only achieve top print results, but we will also be able to meet more customer demands in less time."

Omer Kulka, Kornit's VP of Marketing and Product Strategy, added, "Our mission is to reinvent the garment and textile printing industry with game-changing technologies. It is exciting to see this mission come to life, with visionary customers like Spreadshirt who innovate to open new markets and new business opportunities, all while being more operationally efficient."

Spreadshirt has purchased Kornit Atlas DTG systems to be installed at multiple sites

www.kornit.com ■

Roland launches upgrade programme for TrueVIS VG series

Owners of Roland TrueVIS VG series wide-format printer/cutters now have the opportunity to upgrade the print durability guarantees, capabilities and cutting power of their existing inkjets under the 'TrueVIS Value-Up Programme'.

The TrueVIS Value-Up programme gives VG owners access to several VG2 advantages, including TR2* ink compatibility, a wider colour gamut with ultra-vivid True Rich Color enhancement, new cutting and automated maintenance capabilities, and advanced productivity and efficiency features.

"Our new Value-Up Program offers a quick and easy way for current VG owners to 'super-charge' their existing printer/cutters with next-generation TrueVIS VG2 colour and performance," noted Daniel Valade, Roland DGA Product Manager of Digital Print. "This represents our commitment to providing Roland users with the tools and technologies they need to build their businesses and better serve their customers."

With the upgrade, VG owners also obtain a host of new features that improve print and cut accuracy and usability. Crop mark options are added for even greater precision when cutting laminated printed materials. A newly added PerfCut mode allows for printing, cutting and die-cutting in one seamless operation. In addition to the Print & Cut function, VG owners can take advantage of the Cut & Print function, which allows users to cut first and then print later, helping to reduce edge curls when dealing with thin media, such as heat transfer films for apparel decoration.

VG-640/540 users can upgrade their devices by downloading the specified firmware and the latest version of VersaWorks 6 RIP software.

** The VG series does not support TR2 Orange ink. TR2 White ink is available in 250ml.*

www.rolanddga.com ■

Sun Chemical SunPak FSP inks achieve new standard in eco-friendliness

Based on renewable bio-based materials, Sun Chemical's flagship food packaging offset inkset, SunPak FSP, has achieved a new standard in eco-friendliness through a combination of compliance and sustainability. The inkset is fully compliant with all existing food packaging legislation worldwide, and also has been independently tested to prove the high level of its environmental sustainability.

The analysis of SunPak FSP was carried out by Beta Analytic, which measured the ratio of radiocarbon in the inkset relative to a National Institute of Standards and Technology (NIST) modern reference standard (SRM 4990C). The results were accredited to ISO/IEC 17025:2005 accreditation.

The ratio of radiocarbon was calculated as a percentage and reported as the percentage of 'bio-based carbon', which indicates the percentage of carbon in the inkset from 'natural' (plant-based) sources versus 'synthetic' (petrochemical) sources. The test showed that, on average, 77% of the total organic carbon in the inks in the SunPak FSP range is bio-based carbon content, with only 23% being fossil carbon, of which the majority relates to pigments.

Felipe Mellado, Chief Marketing Officer and Board Member at Sun Chemical, commented: "For some years Sun Chemical has been working to promote sustainable solutions, such as SunPak FSP, and our ongoing approach to sustainability guides the way we develop, manufacture and distribute products, as well as how we work with our customers and suppliers. It's therefore gratifying now to be able to provide independent evidence of the sustainable quality of SunPak FSP, one of our most popular ink ranges. Our emphasis on sustainability will continue to be fundamental to our innovation and product development and, as demonstrated by the demand for SunPak FSP, is gaining broad support from our customers."

www.sunchemical.com ■

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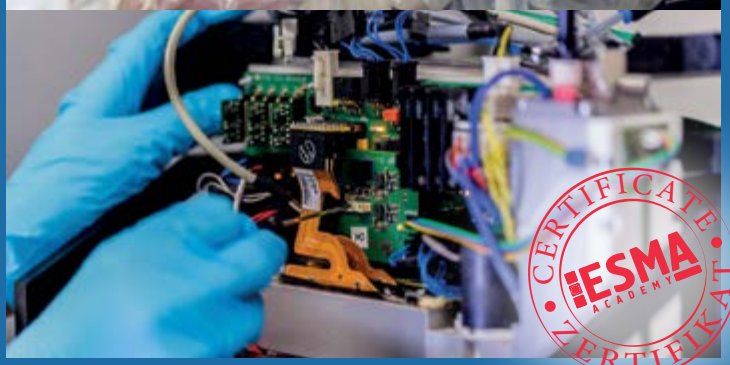


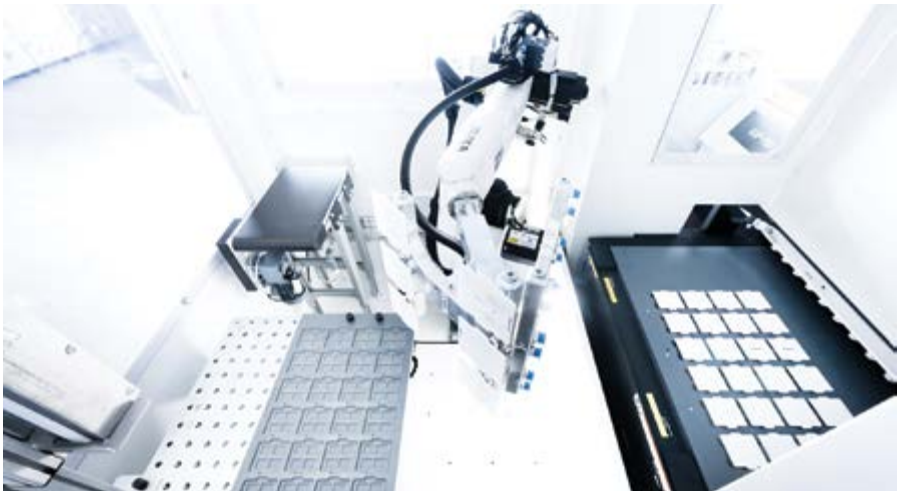
WWW.ESMA.COM/AKADEMIE

Robotics brings flexibility to standardised automated digital printing

German company DP Solutions now offers a variable solution tailored to customer requirements with an automated print material feed operated by a robotic cell. Thanks to sophisticated material feed technologies, pick-up concepts and intelligent handling systems, the company has succeeded in achieving a new level of flexibility in standardised automated digital printing.

In the demo application, a Kuka Cybertech nano KR 10 robot automatically equips a Mimaki UJF-7151 Plus UV inkjet printer with objects to be printed. The automated production of injection moulded parts on an area of just 10m² using a specially developed controller for automation tasks is just one example of what is possible and what has already been implemented today.

It is possible to print plastics, metals, painted, powder-coated surfaces, etc. in an automated system. Full-colour prints, print quality, small batch sizes or quantities of 1, short throughput times for prototypes, reduction of set-up times and set-up costs are just a few keywords for this promising technology.



Inside the robotic cell; a Kuka Cybertech nano KR 10 robot equips a Mimaki UJF-7151 Plus UV inkjet printer with objects to be printed

Solutions of this kind can be configured individually with one or more printing systems, with feeds of the most different materials to be printed – also, if they have to be changed in between.

www.dp-solutions.de ■

Inkcups introduces two new digital inks

T2 digital ink from Inkcups is designed for Tritan plastic (a BPA-free durable plastic) and is the only digital ink for this substrate that does not require pre-treatment. After a rigorous testing process, Inkcups has formulated an ink for drinkware manufacturers who want to speed up their operations while ensuring adhesion to Tritan products – which are becoming increasingly popular as a result of the growing movement to help the environment and reduce waste. The T2 digital ink provides highly durable and long-lasting image reproduction on Tritan that will not crack or chip.

With the invention of BB digital ink, Inkcups produces high-quality graphics with strong adhesion, and has resolved the long-standing industry challenge of achieving full-colour graphics on flexible bottles without chipping, cracking or distorting after only a short period of time or following the 'squeeze test.' Suited for soft and flexible plastics, common BB digital ink applications include bicycle water bottles, stadium cups, sports bottles, shakers and infuser bottles. The ink is compatible with Inkcups' suit of digital printers. Pre-treatment is necessary before decorating plastic bottles with the BB ink. This formulation is a combination of a flame-treatment followed by a primer.

T2 and BB Series digital inks are engineered and manufactured in the USA and available for order now.

www.inkcups.com ■

Printed sample of Inkcups' T2 ink

Lechler claims another victory in ESMA football tournament

On a rainy September morning, Eptanova, Fimor, Lechler, Marabu and Saati joined the hosting party Sefar in Staad near the Swiss town of St. Gallen to compete in the ESMA Football Tournament 2019. Despite the autumn weather conditions, players and supporters were kept warm by the emotions delivered by eight games, culminating in the final decided in a penalty shootout. Following a goalless draw against Saati, Lechler kept their nerves to carry the day and celebrate yet another title. The day of competition and entertainment closed with a joint dinner at which the plans for the next tournament in 2021 were discussed.

www.esma.com ■

The ESMA Football Tournament 2019

Adphos celebrates 25th anniversary of aNIR

Used for heating, forming, drying, melting and curing processes in a large variety of industrial sectors, advanced Near InfraRed (aNIR) systems from adphos can vary from 0.2 kW to 20,000 kW depending on application-optimised customer-specific process requirements. Plastics, steel, graphics, automotive, pharmaceutical, food and semiconductor industries as well as thermal process engineering, 3D manufacturing and sintering application have all benefitted from advanced NIR process technology, and within the last 25 years over 2,000 production systems have been successfully installed.

www.adphos.com ■

Adphos has continued to optimise its aNIR-technology over the last 25 years

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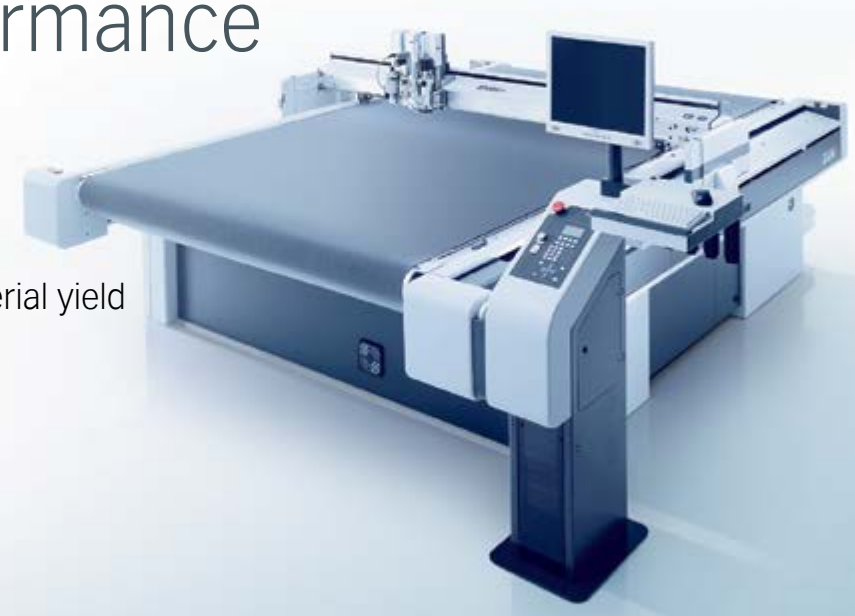

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ADDING VALUE AT INPRINT

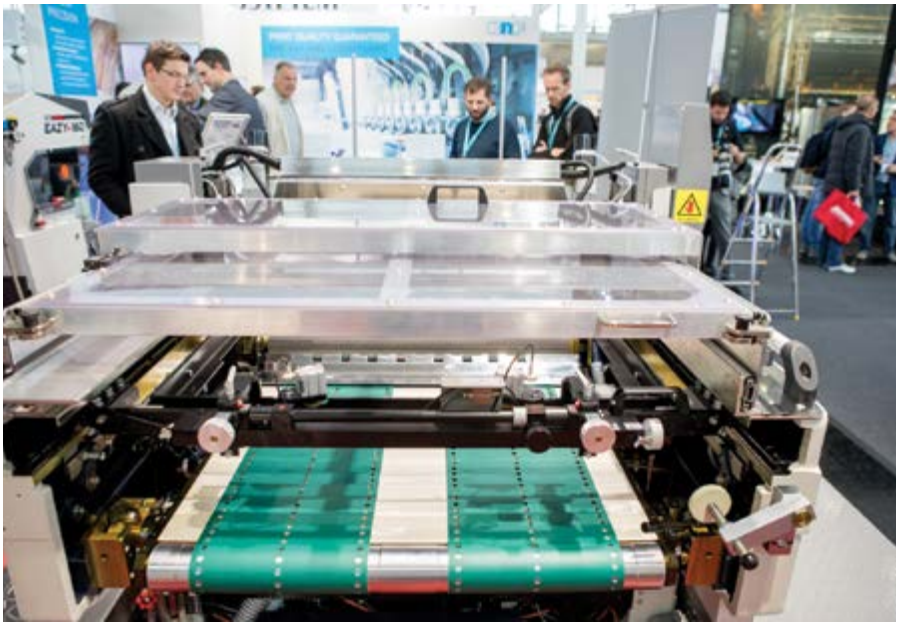
A new consultancy area at InPrint Munich 2019 will offer visitors free and independent advice on how to move their businesses forward

From 12–14 November 2019, the International Exhibition of Print Technology for Industrial Manufacturing will present progressive print machinery, equipment and approaches to solving manufacturing issues, adding value to products and brands, and venturing into new markets.

Equipment and services on display at InPrint Munich 2019 are specifically developed to facilitate the cost-efficient conversion and customisation of industrial and consumer goods. This includes automotive parts, printed electronics, packaging, drinking bottles, food containers, fashion items, pharmaceuticals and cosmetics, as well as the decorative finishing of flooring, tiling, interior decorations and furnishings.

For manufacturing executives and print providers seeking to gain a competitive edge, InPrint Munich aims to provide a platform to find real production solutions for their specific needs.

"You will enter a real powerhouse of innovation," said Nicola Hamann, Managing Director at Mack Brooks Exhibitions, which organises the show. "A visit at InPrint Munich will inspire you to try new ways of producing goods while providing a good network of suppliers to help you source and successfully integrate the best equipment to achieve your goals."



InPrint Munich 2019 features 120 exhibiting companies from 15 countries

CONSULTANCY CORNER

New at InPrint Munich 2019, the Consultancy Corner offers visitors the opportunity to meet with knowledgeable and experienced experts and address individual production issues when using print technology in production lines. In personal 1:1 sessions, consultants will answer specific technical questions, provide valuable guidance and give specific advice on how to move your business forward. Appointments can be booked online now.

CONFERENCE PROGRAMME

A three-day conference programme alongside the exhibition features more than 60 international top speakers from across the entire print and manufacturing sector. Presenting case studies, technical talks and panel discussions, they guide visitors through the necessary steps to successfully implement new print technology in manufacturing lines – from choosing the best inks, printheads and software tools to metrology and curing equipment, plus best practices for effective machine integration – addressing the pros and cons of different approaches and technologies.

Visitors have the opportunity to meet with knowledgeable and experienced experts

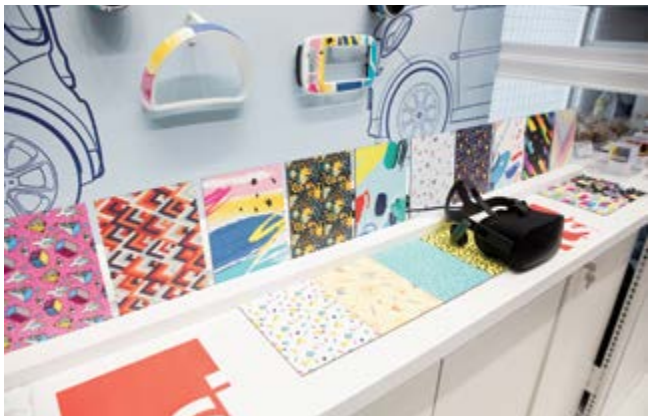
VISITOR REGISTRATION OPEN

InPrint Munich takes place from 12–14 November 2019 at the Munich Trade Fair Centre in Germany. Exhibition, conference stages and the Consultancy Corner are located in Hall A6, accessible via the East Entrance of Munich Trade Fair Centre.

Opening times are from 9am to 5pm on all three exhibition days. Visitors can now register and buy their tickets online at a special rate. Alternatively, full price tickets can be purchased on-site on all three exhibition days.

Further information on participating exhibitors, conference programme, travel and accommodation, as well as video footage and ticket shop can be found on the show website. ■

"InPrint Munich will inspire you to try new ways of producing goods" – Nicola Hamann



Exhibitors are set to present ground-breaking innovations in digital, inkjet, screen and speciality printing on diverse shapes and materials

Further information:
web: www.inprintmunich.com

2020 AND BEYOND

ESMA wraps up 2019 and shares its plans for the forthcoming year, including appearances at major trade shows

Organiser of application and technology-based educational events, the European Specialist Printing Manufacturers Association (ESMA), has had an intense year, which closes with a range of events in Düsseldorf. A member pavilion represented ESMA at the world's premier fair for plastics and rubber industry, the K show, from 16–23 October. On 29–30 October 2019, the 6th edition of TheIJC took place, the world's biggest conference for all those involved in inkjet engineering and chemistry. On 27–28 November 2019, the international community of OEMs, suppliers, glass manufacturers and brand owners meet for the 8th edition of GlassPrint

Following excellent feedback from more than 70 alumni, the 5th German ESMA Academy 'Industrieller Digitaldruck' returns to Stuttgart on 2–5 December 2019. The four-day training covers all theoretical and practical aspects of piezo inkjet, inks, substrates, curing, printing equipment and colour management. All who want to obtain a well-founded overview of digital printing and make educated decisions to what extent inkjet could be integrated in their production process can still register at www.esma.com/akademie.

2020

Next year will start with the ESMA General Assembly in Paris – the yearly gathering of the association takes place on 13 March 2020 and is open to all members and technology partners. Shortly thereafter, on 24–27 March 2020, FESPA Global Print Expo in Madrid will feature an ESMA member pavilion for industrial printing in Hall 1.

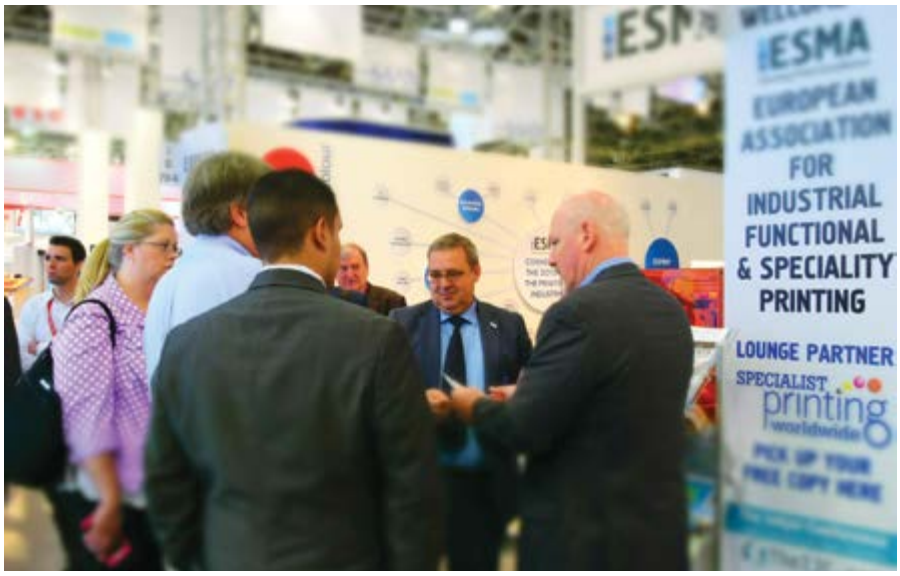
ESMA Academy continues its lab courses on digital printing

Together with key industry experts, ESMA will repeat the Inkjet Essentials course on ink design and integration over 21–24 April 2020 in Edegem near Antwerp, Belgium. This new educational series offers a detailed view on all factors and challenges in ink development pipeline. Lab testing, ink-media behaviour and drop watching are discussed both in theory and in practical experiments. For more details about the programme, location and registration, please visit https://esma.com/inkjet-essentials

DRUPA

All recent organisational efforts will culminate in June 2020, at drupa, the world's no. 1 show for printing technologies. For the third time, ESMA will be organising a member pavilion to provide a 360-degree view on print as part of the manufacturing process.

"Our presence at drupa 2020 reflects the market developments," explained Peter Buttiens, CEO of ESMA. "With an increasing number of solutions offered by digital inkjet, we still see a strong representation of screen printing manufacturers. By some considered as competitors, these technologies are as a



The ESMA pavilion at drupa 2020 will provide guidance in industrial printing applications

matter of fact complementary for many niche and volume applications. All visitors to ESMA member stands will therefore gain a full picture of what is possible and most suitable for their projects," he concluded.

FURTHER AHEAD

Further plans include showcasing the potential of specialist printing at Printed Electronics Europe (13–14 May 2020 in Berlin), glasstec (20–23 October 2020 in Düsseldorf) and Interzum (4–7 May 2021 in Cologne). The latter is a must-attend event for everyone aiming for success in the market for furniture production and interiors. ESMA is currently discussing a member pavilion dedicated to printing on wood and other substrates, functional printing, colour management and vision inspection. All members interested in joint exhibiting at any of the above fairs are welcome to contact the head office at info@esma.com.

Looking into 2021, the dates for the next edition of Advanced Functional & Industrial Printing (AFIP) have been confirmed for 2–3 March 2021. The conference will be held at Radisson Blu Scandinavia in Düsseldorf and will feature a broad scope of technical insights in printing technologies integrated in production processes of today and future. ■

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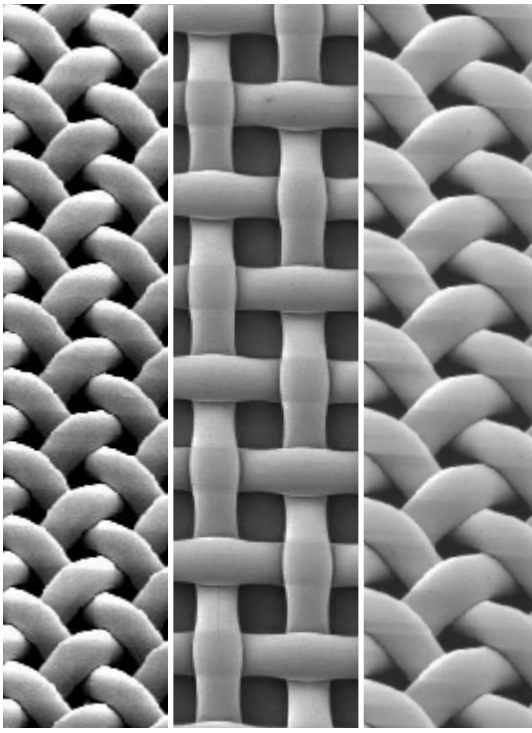

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SPECIALIST printing WORLDWIDE

WORKING IN HARMONY

Frank Toma shares the latest news about the classification of titanium dioxide

Frank Toma

As reported in *Specialist Printing Worldwide* issue 3, 2017, there was a proposal by the French Anses *(Agence nationale de sécurité sanitaire, de l'alimentation, de l'environnement et du travail)* in November 2015 for a harmonised classification of titanium dioxide, a commonly-used white pigment, as an inhalative carcinogen (Carc. 1B – H350i).

While the Committee for Risk Assessment (RAC) of the ECHA disagreed with the Anses due to a lack of reliable evidence, they still recommended a harmonised classification as a suspected inhalative carcinogen (Carc. 2 – H351).

The RAC recommendation found its way into the 14 ATP (Adaption to Technical Progress) of the CLP, which was now ratified by the European commission. Accordingly, there will be a new entry in table 3 of Annex VI for 'titanium dioxide; [in a powder form containing 1% or more of particles with diameter ≤ 10 microns]', stating a harmonised classification of Carc. 2 with the H351 and the pictogram GHS 08.

EXTRA CAUTION

Additionally, the entry will come with a new note V (stating acc. to point 1.1.3.1 in Part 1 of Annex VI that, if titanium dioxide is placed on the market in form of fibres, it has to be evaluated, whether an ever higher category (Carc. 1A or 1B) applies and/or additional exposure routes have to be considered).

In Annex II, two new EUH-statements are introduced for the labelling of mixtures of titanium dioxide:

The EUH 211 'Warning! Dangerous droplets may be formed when sprayed. See information supplied by the manufacturer. Comply with the safety instructions' has to be used on the packaging of liquid mixtures containing 1% or more of titanium dioxide particles with a diameter equal or below 10 microns.

The EUH 212 'Warning! Dangerous dust may be formed when used. See information supplied by the manufacturer. Comply with the safety instructions' has to be used on the packaging of solid mixtures containing 1% or more of titanium dioxide.

The label on the packaging of liquid and solid mixtures not intended for the general public and not classified as hazardous, which are labelled with the EUH211 or EUH 212 shall also bear the EUH 210 'Safety data sheet available on request'.

EXCESSIVE?

Is that appropriate? In my opinion not really, since there are no known cases of a worker getting cancer due to using titanium dioxide (one case in the US is known, but the worker in question also smoked during his working life).

On the other hand, the new harmonised classification will have a strong impact on the industry in fields like:

- Working safety (documentation, health monitoring etc.)
- Waste management (because wastes containing more than 1% of carcinogens have to be declared and handled as "dangerous wastes")
- Use of products containing titanium dioxide for toys and others (since for many products carcinogenic ingredients are excluded from use).

More information is available here: https://esma.com/images/downloads/news/14th_ATP_to_CLP.pdf ■

Sources used: Draft of the 14. ATP, and article by Gabriele Heller, published in Specialist Printing Worldwide, *issue 3, 2017 (p.38)*

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