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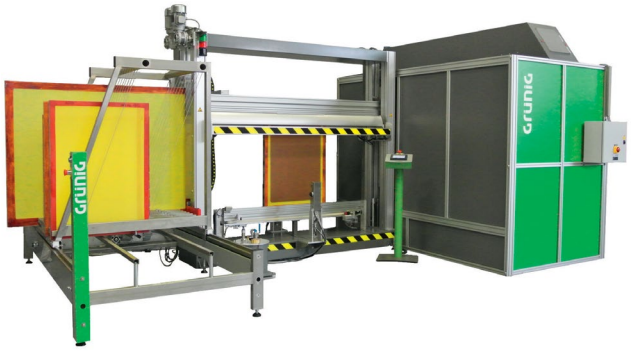

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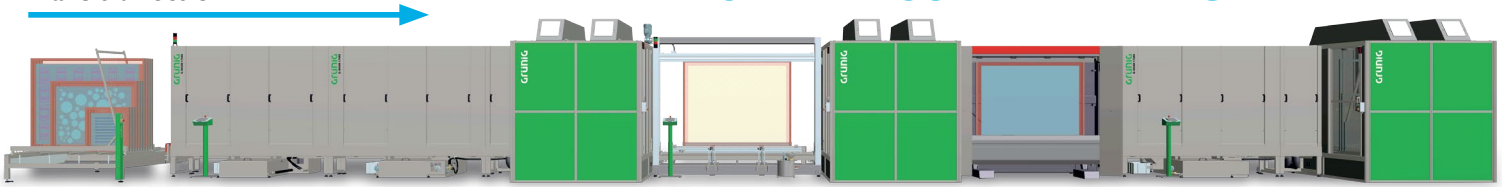

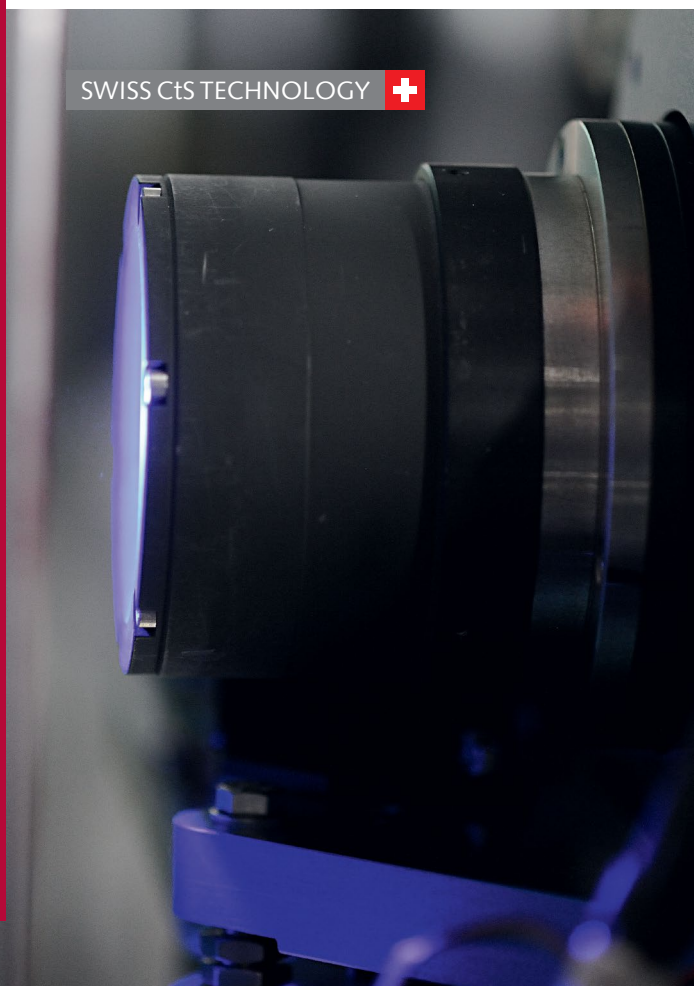

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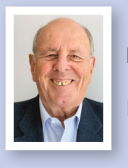

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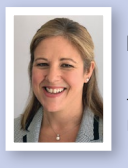

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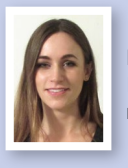

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LIGHT THE WAY

Pamela Lee explores the benefits of UV LED and discusses how best to utilise this technology in print applications

Pamela Lee, Senior Product Manager, OmniCure at Excelitas Technologies Cor

Light-emitting diodes (LEDs) have been broadly adopted in the general lighting market, and now in the ultraviolet (UV) space, due to their many benefits – from their long life to lower power consumption and improved environmental footprint. The rate of commercial adoption has been positively affected by improved pricing, performance, and support from formulators of adhesives, coatings, and inks.

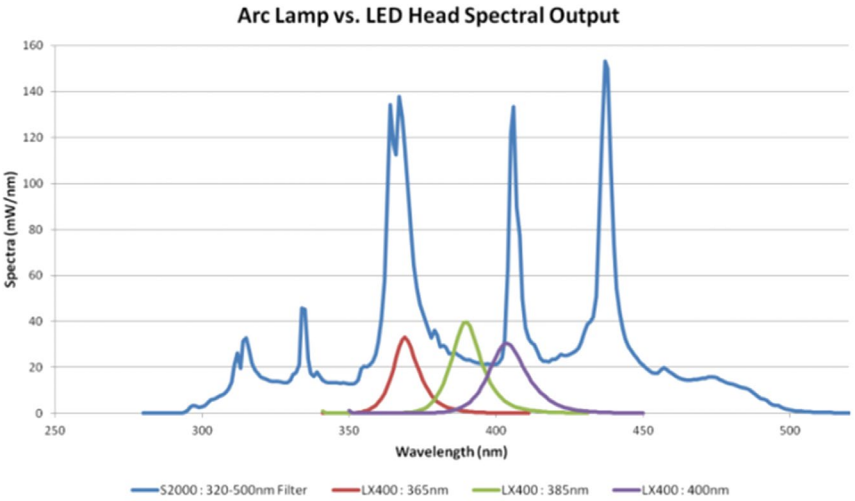
The use of UV LEDs has generated new print opportunities, performance advantages and productivity enhancements, helping manufacturers to differentiate their applications and further driving acceptance and successful integrations of LEDs onto printer platforms.

MARKET OVERVIEW AND CURRENT STATE OF ADOPTION

Technological challenges, including low output power/efficiency, high cost, integration/qualification time, cure quality and materials compatibility, have been surmounted over the years so that today's UV LED solutions are commercially viable.

Unlike other sources such as arc lamps, LEDs emit a narrow spectrum of light at specific wavelengths and can be classified into four bands: Vacuum UV (100–200nm), UVC (200–280nm), UVB (280–315nm) and UVA (315–400nm) – see **Figure 1**).

The spectral output of arc lamps is distributed across the entire UV band, while typical UVA LED outputs fall between 365–405nm, with spectral content at specific bands. The most mature and commonly adopted UVA LED wavelengths are 365nm, 385nm, 395nm and 405nm; the majority of print applications and inks respond to – and are formulated for 395nm.



	UVV	UVA	UVB	UVC
Lamp*	40%	45%	12%	3%
365nm LED	1%	99%	0%	0%
400nm LED	97%	3%	0%	0%

Fig. 1: UV Lamp vs. LED Head Spectral Output

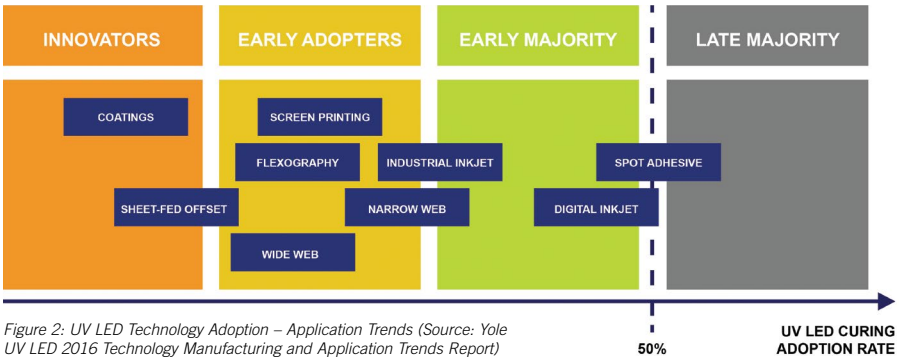


Figure 2: UV LED Technology Adoption – Application Trends (Source: Yole UV LED 2016 Technology Manufacturing and Application Trends Report)

Adhesive curing remains by far the most conventional application for UV LEDs, which were initially used primarily in smaller area/spot configurations utilising adhesives. Lower cost of investment and greater availability of compatible materials stimulated success in this market segment. A Yole Développement research report, 'UV LED Technology & Application Trends,' shows implementation

Fig. 3. Excelitas Technologies' OmniCure AC Series of UV LED curing solutions

rates in various applications (see **Figure 2**).

In the printing industry, UV LEDs are most frequently used in inkjet/digital printers, with narrow web close behind. Availability of higher output LEDs has in turn enabled higher-performing UV LED drying solutions, capable of addressing faster, more demanding print speeds.

Increased competition is driving costs down so that LED-enabled solutions are no longer cost-prohibitive for integration onto print platforms requiring a larger area of cure. In addition, technology advancements, availability of expanded UV LED formulation options, and partnerships among hardware and materials suppliers have expanded the industry's knowledge base and LED expertise to accelerate validation. Collaboration has supported market acceptance and commercialisation of newer machines using next-generation technology, demonstrating that UV LEDs can successfully replace traditional lamps.

UV LEDS FOR PRINTING

Printing processes have evolved considerably over time from printing presses to modern-day offset, flexography and digital printers. UV printers are a fast-growing sector, where UV LEDs are displacing traditional mercury arc lamps for curing UV inks. Lamps provided an effective solution for many years with broad spectrum and high output at various peak wavelengths in the UVA, UVB and UVC regions. However, LED solutions eliminate the disadvantages of older mercury lamp solutions – such as their shorter lifespans, higher operational costs, reliability issues, uneven curing, and excessive heat generation.

The benefits of low power consumption, long lifetime, environmental benefits, low temperature curing, instant on/off, reduced total cost of ownership, and increased functionality are driving integration of UV LED solutions. Previous barriers to LED adoption have been overcome; these are detailed here/overleaf for reference, with a review of where they stand today.

Output power and efficiency: UV LED efficiency has dramatically improved, and concentrated high-power systems created by grouping arrays of LED die have become more readily available to support higher throughput capabilities. Ongoing enhancements will continue to enable faster operation speeds with no negative impact on cure quality or performance.

Cost: While the upfront investment of an LED system is higher than its lamp-based counterpart, the acquisition cost is quickly offset by long lifetime and efficiencies including reduced power consumption, limited maintenance and downtime, and easy integration. The price premium for LED is also narrowing as costs decline for UV LED hardware and compatible inks. These cost reductions will continue as LED yields continually improve and the overall demand for UV LEDs increases. The economic gains associated with utilising UV LED systems in printers are shortening the payback period.

Materials compatibility: When UV LED curing systems were first introduced, the availability of compatible inks, adhesives and coatings was limited. In fact, there may have been insufficient collaboration between materials providers and curing system suppliers to pre-qualify and optimise the formulations in advance of market introduction. Many of the existing materials formulations did not respond well to the narrow spectrum of LEDs. Costs for the few available UV LED options were prohibitively high, while performance was not yet competitive with legacy lamp formulations. However, the landscape has dramatically

Continued over

Performance Advantages	Productivity Enhancements	Ease of Integration
Deeper and more reliable cure	Higher yields, consistent and reliable curing	Small form factor and no shutters or exhaust ducting required
Higher degree of process control and reliability	Faster print speeds and support for combination printing	Adaptable with added features; output control and monitoring, instant on/off
Support for thicker films and darker/more opaque colours	Less down time	Scalable: increase speeds and expand cure area
Faster print speeds and adhesion	Expanded print capabilities	Environmental benefits
Customisations and unique finishes on different materials	Lower maintenance and operational costs	Low energy consumption and no VOCs

Table 1: Benefits of UV LED curing for print applications

changed, and ink formulation has improved, significantly enhancing the materials' responsiveness to UV LEDs. Lower energy doses are needed for faster and more efficient cure, and ink properties have been optimised for enhanced surface cure, finish, and chemical resistance. Costs for LED-tailored materials have come down. As the market further matures, a wider range of proven solutions will become available.

"LEDs can provide a more even and uniform cure than traditional curing solutions"

Cure quality: Tailored formulations for UV LED curing have addressed the reactivity of materials to accelerate both cure rate and quality. Unique finishes and support for a wider range of substrates can be achieved by leveraging features of LED solutions (such as on/off pulsing that is not possible with traditional lamps). UVA LEDs also provide a deeper and more reliable cure with strong adhesion. Developments are currently progressing to explore UVC as a possible method for further improving surface cure. LEDs can also provide a more even and uniform cure than traditional curing solutions, which produce uneven irradiation across the cure area. Excelitas' OmniCure AC Series of UV LED curing solutions can provide tight uniformity for consistent and even curing by leveraging a patented technology to individually control LED modules and adjust the output, enabling customised outputs for tighter process control (see **Figure 3**).

ADVANTAGES FOR PRINTERS

In addition to the general benefits of LEDs, UV LED enabled printers also benefit from performance advantages, productivity enhancements, environmental benefits, and easy integration. Some of these key benefits are further highlighted above in **Table 1**.

UV SOURCES AND FACTORS THAT AFFECT A CURE

The UV curing process requires polymerisation of a photosensitive material such as an ink, adhesive or coating. Photo-initiators activate the hardening process, and cross-linking solidifies the material when sufficient energy is received to complete the reaction. In this procedure, spectra content is important. If the LED wavelength does not match the absorption spectra of the photo-initiator, the material will not cure. In addition to delivering sufficient energy and wavelength match, other factors also impact the cure. **Figure 4** illustrates the process of UV curing, while **Table 2** shows key parameters that affect cure.

Fig. 4: UV curing process

	Parameter	Description
1.	Irradiance (W/cm²)	The minimum threshold required to initiate polymerisation, where peak irradiance is inversely proportional to working distance.
2.	Dosage/Energy Density (J/cm²)	The number of photons seen at the substrate over 'x' period of time and is the time integration of irradiance. Sufficient energy must be received to convert and complete the reaction.
3.	Exposure/Dwell Time (s)	Duration of time the substrate is exposed to the UV energy. Typically, a function of speed/conveyor and size of emitting window.
4.	Spectral Content/Wavelength	Wavelength match will determine compatibility with and responsiveness to material formulation/effectiveness of cure.

Table 2: Key UV curing parameters

Very high irradiance on its own will not necessarily produce the best result, as high peak energy may not be not enough to fully cure the material and increasing the exposure time would worsen the results. Specifications alone do not determine the quality and compatibility of materials in a curing process, and all the parameters must be appropriately matched to achieve an optimal result.

SELECTING THE RIGHT UV LED SYSTEM

Determining the right UV source for a given application can be challenging. As mentioned earlier, the specifications alone do not always dictate how well a system will perform in a specific process. The best results are achieved with applications testing and integration to optimise the solution.

Factors to consider when selecting an LED dryer include:

1. Material to be cured
   a. Compatibility with chemistry – is the formulation tailored for UV LEDs?
   b. Photo-initiator wavelength match – 365nm, 395nm, 405nm?
   c. Substrate – are there any special characteristics of the material or known challenges/characteristics to consider?
2. Application requirements
   a. What irradiance and dose are needed to cure the material?
   b. Process speed required
   c. Working distance, cure area/size
   d. Homogeneity needs
3. Installation considerations
   a. Air vs. water cooling – are there any restrictions or preferences for the type of integration? Are chillers & tubing (for water-cooled) available? Are there limitations with airflow (for air-cooled)?
   b. Mechanical size – restrictions in form factor, need for scalability, etc.

CONCLUSION

Compared to traditional lamp solutions, UV LEDs bring enormous benefits to printing processes. Adoption of UV LED curing onto print platforms will continue to increase and will further progress from inkjet and narrow web to screen, flexo and wide web. Constant improvements in UV LED technology and materials formulations will continue to enhance output and performance supporting faster print speeds, and costs will become more competitive to make larger scale printers even more economical. ■

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THE DEVIL WEARS PIXELS

Optimising digital textile printing is not just about the ink. Dr. Stefan Kappaun reveals his pixel-to-output strategy

The digital textile printing market is showing high growth due to the variety of textiles and application possibilities. Key applications are fashion, home textile, sportswear, visual communication like flags, exhibition building, promotional items and interior decoration. This broad range of applications, as well as the rise of digital business models means digital textile printing is considered one of the major growth areas in the whole printing industry.

In addition, the ever-changing awareness of waste of water, materials and logistics is causing companies to switch from analogue to digital production technologies. The associated digital market is showing double-digit growth per year. According to different market research institutes, the output of digitally printed textiles is expected to overtake that of, for example, screen-printed textiles in the next three years.

In order to meet this demand, there are numerous manufacturers who offer machines of different productivity levels. The strong growth trajectory of digitally printed textiles, especially high-end printing systems such as the Durst Alpha 330, are moving into the focus of the industry. For example, the productivity level of an Alpha 330 – with outputs of up to 1,470m² per hour – makes such printing systems an interesting investment for the industry.

THE RIGHT INK

Due to the total increase of digitally printed textiles, the demand for textile inkjet inks is also growing. Almost every fibre family needs its tailored ink system with adequate pre- and post-treatment processes to ensure best application and fastness properties. Acid and reactive inks are used for printing on polyamide and cotton. For polyester materials, dispersion inks are a frequently utilised option. The most versatile and sustainable solution for textile printing are, however, pigment inks as those inks can print on virtually any type of fabric like polyester, cotton, polyamide but also on complex blends or exotic substrates.

Very good fastness properties can be achieved and further optimised with pre- and post-treatment steps. Due to the large variety of substrates, especially the pre-treatment for textiles, inks can differ in nature, composition and application quantity. Thorough optimisation significantly affects the print quality and final fastness properties.

Choosing the right ink clearly paves the way towards a broad application portfolio, however, the price of the ink influences the variable production costs and has an important effect on the customers' business models.

A Durst Alpha 330 textile press printing reactive and pigment textile inks

Ink prices have fallen sharply in recent years, particularly reactive inks. Nevertheless, the price levels are stagnating now. Within the next few years, no significant price reduction is expected without compromising the quality level of the inks (colour strengths, etc.).

OPTIMISING PRODUCTION

To optimise production costs, print service providers are making every effort to keep the ink price down but often overlooking other critical factors: profiles, workflows and colour management. Frequently, non-optimised profiles, workflows and colour management negatively impact the customers' profitability. In many cases, optimised profiles, workflows and colour management can cut ink consumption more than 10% without putting any compromise on the image quality or the fastness properties of the product.

In textile printing, there are other factors beyond the specific printer or ink influencing the final colour or fastness of the product. For example, different fabrics, pre-treatment methods or temperature settings of dryers strongly impact the printing process. Therefore, a separate profile for each changing production environment should be created.

PERFECT PROFILES

When creating a profile, there are a variety of settings that have to be controlled in order to adjust the quality of the print and ink consumption. Inexpensive RIPs often do not offer adequate profiling and influence compensation solutions such as, for example, the colour compensation of the unprinted textile itself. Companies are losing a lot of money if they do not take this into consideration; additionally, the production costs might be increased due to an un-optimised ink consumption level. The investment in good profiles, workflows and professional colour management pays off instantly through a production approach that considers all relevant elements of the process: a real pixel-to-output production strategy.

A pixel-to-output strategy is the only way to fully exploit the potential of industrial textile printing. A pure focus on the price of the ink is not sufficient, since wrong profiling, poor workflows and insufficient colour management result in a reduced print quality and increased production costs. Durst is dedicated to this topic with its own team. Many customers have already been helped to reduce their production costs with the Durst pixel-to-output approach. ■

Dr. Stefan Kappaun is Executive Vice President of Inks and Fluids and Segment Manager of Textile Printing at Durst Group

Dr. Stefan Kappaun

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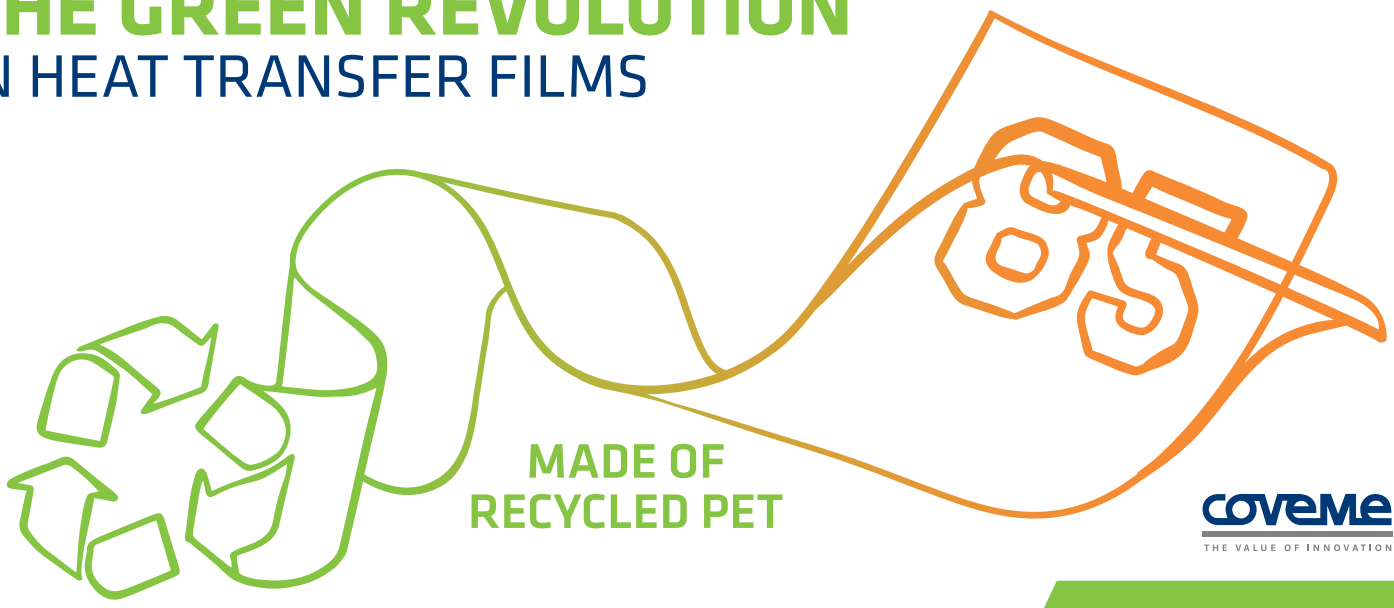

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GO WITH THE FLOW

Centralising data flow makes production a more streamlined, synergistic process. Jan De Roeck explains how cloud technology can transform digital workflows in the packaging industry

The design and creation of packaging can often be a complex and time-consuming process. The pack design process can take anywhere from around six months to over a year between concept development and hitting the store – and in today's retail environment, one that thrives on breakneck speed and agility, a lengthy gap simply isn't hitting the mark anymore. Consolidation in the packaging industry has been mostly horizontal, leading to larger companies but not necessarily to a more efficient process.

For packaging converters, increasing lead time pressure creates a need for new efficiencies. Analogue technology is still advancing, but with a rise in back office and administration tasks being digitalised, the rest of the packaging production line needs to keep up and get much better integrated for the purpose of data sharing. One key way that contemporary industry has developed its processes is in the introduction of cloud technology.

Fundamentally, cloud technology is the sharing of resources, software and information through a dedicated internet network. This information is stored on physical or virtual servers, which are maintained by a cloud provider. Due to significant developments in how we as individuals create, save, store and access data, users no longer need to save documents on one device and then only access them through that same device. Cloud functionality creates a new standard of hyper-connectivity, while taking the strain away from on-site servers.

GROWING CLOUD FUNCTIONALITY

Steve Jobs, late co-founder and chairman of Apple, once described non-connected computers and devices "Byzantine in comparison" to cloud-enabled technology, long before the technology gained the foothold it has now. This visionary leader had a strong belief in the power of cloud computing and his views were ultimately proved right. In the context of today's technology landscape, the demand for cloud services has boomed, strengthened by an Internet of Things (IOT) and a burgeoning 'Internet of Packaging' industry of smart and intelligent packaging that has grown in parallel.

With millions of devices across the globe being IoT enabled – from specialist equipment to the more mundane everyday devices that go everywhere with us – we have never been more connected to either each other or to the digital space. It stands to reason that the world of business can benefit from this surge and so far the figures certainly back that up. Research agency Gartner forecasted a 17.5% growth in cloud service revenue through 2019. The same report projects that cloud based services could be worth $331 billion by

Jan De Roeck, Director of Marketing – Industry Relations & Strategy at Esko

"We have never been more connected to either each other or to the digital space"

2022, which demonstrates that the technology and its varied applications are driving real bottom-line value across a spectrum of industries.

Updating existing processes to a cloud infrastructure highlights two different ways of hosting data: a public or private cloud. Each structure has its own unique complement of benefits to a business, but the way they operate is very different. A public cloud is a server held by an external business, which means the business that operates on it is not responsible for the management – and to a lesser extent, the security – of the data held there. Information is stored in central cloud systems at the provider's dedicated data centre, with the provider being responsible for management, maintenance and security. A key benefit for businesses with this approach is that the development of the platform being the responsibility of the provider, can bring dramatically reduced lead times in new product deployment and testing. However, that same benefit of development being the provider's responsibility can also be a detriment; some companies may feel a loss of hands-on control when the advancement and maintenance is completed by a third party. The alternative option is a private cloud, also referred to as an 'enterprise cloud'. This is where the participatory business hosts their own cloud server internally, protected by the business's own security firewalls.

One advantage of private cloud hosting is that development is completed in-house, but also comes with the maintenance and management responsibilities too, requiring additional overheads in terms of time and manpower.

SINGLE AND MULTI-TENANT

There are two main usage architectures to be aware of when considering the use of cloud technology: Single-Tenant and Multi-Tenant. Single-Tenant is the architecture wherein the company using it has one single standalone instance of the technology, software and application infrastructure. The benefit to businesses is that the technology can be bespoke-built to perfectly match the unique needs of the business. In addition, Single-Tenant cloud application structures tend to be easier to secure and quick to enact changes and developments. An example of this in practice is Esko WebCenter, which essentially acts as a bespoke platform for workflow

integration and free flow of data for each business that invests in it.

Multi-Tenant architecture in comparison is a singular platform where multiple individual businesses can access and store data, which is partitioned to ensure businesses can only access their own information. Multi-Tenant systems must meet the needs of multiple companies and industries and to this end, these applications are typically less bespoke by necessity, but equally, are often refined to meet divergent needs and serve numerous functions.

Esko Share & Approve functionality is an example of a Multi-Tenant architecture; this solution makes packaging approval cycles up to three times shorter with its cloud-based approach to approval cycle management. Share & Approve gathers feedback, queries, amendments and approvals from multiple parties through a cloud-hosted platform that can render packaging in a 3D state for review, using the actual production data of the packaging.

"Esko is building cloud capability into its portfolio of software and hardware solutions"

The nature of fast-paced business today requires companies and individuals to adapt to new ways of working and to inject novel capabilities directly into the workflow. The print and packaging industry is certainly no exception. At Esko, our customers rely on us to deliver technology that builds innovation into existing operations and make core efficiency gains without disruption, which is why our suite of software solutions is designed with synergy in mind. Progress is a fundamental value of Esko; we constantly evaluate new IT concepts and have built and deployed a private cloud infrastructure for use by our software platform applications. As we continue to innovate and develop new solutions for integrated prepress, we will continue to add cloud functionality to the wider Esko suite of solutions.

INTRODUCING MICROSERVICES

Microservices are another element of cloud computing. The term refers to a specific way of building cloud applications, which tailors the application to a specific business need through a set of services. Each individual service, as part of the larger application, communicates through application programming interfaces, known as APIs. As a principle, a microservice architecture brings a number of agility benefits to businesses that adopt it as a product development method – for example, the ability to release software projects faster and more frequently.

As an architectural cloud structure, microservices enhance the flexibility of inherent softwares, allowing for greater creativity and adaptability. Esko's extensive, and growing, private cloud infrastructure is testament to its belief in the future of prepress. Esko has invested in the technology because it has experienced first-hand where the benefits of cloud infrastructure lie for businesses across the packaging supply chain and the heightened efficiencies it unlocks.

Esko Share & Approve is a great example of a microservice in action. This business tool revolutionises the traditional approval cycles for packaging, making the process up to three times faster. Users can upload designs onto Share & Approve, with the capacity to review and annotate generated 3D renders without the need for structural CAD data, unlocking accurate version control, standardisation across feedback collection, both internal and external, and time-savings from increased workflow connectivity.

ESKO CLOUD

At the heart of our cloud development is the Esko Cloud. This is the central cloud platform on which Esko offers microservices to its users. Customers can participate without initial installation or permanent licensing costs, deliver and share data, create advanced calculations, as well as distribute and delegate human work with ease.

Using the Esko Cloud as a robust base, the Esko suite of software solutions can reduce the packaging development cycle from an average

Continued over

Cloud connectivity helps businesses to accomplish more with existing resources

of six weeks to three weeks, depending on packaging type. There are huge efficiency gains to be made reducing human process steps by integrating digitally and avoiding duplication of data, along with the consequent repetition of work. Esko aims to create an affordable step-in point for packaging supply chain businesses to harness the benefits of cloud-based working and put the focus on collaboration. In the wide format, packaging and labels sectors, we rely heavily on communication between businesses, which makes the highly shareable nature of data in cloud technology a highly attractive proposition.

The Esko Cloud is the core technology grounding that makes the Esko software suite highly integrated. Turning investments into an agile 'Software as a Service' ('SaaS') programme offers businesses the adaptability and fluidity to meet the needs of an evolving market, without the overhead costs associated with installing and maintaining on-premise IT solutions or that come with entrenched software purchasing. The Esko Cloud frees businesses from these on-premise systems, eliminating IT costs of maintaining on-premise configurations that often trail behind equivalent systems in terms of technology, or are left without maintenance because they continue working for the foreseeable time with existing features.

Where permanent licensing tends to foster stagnation, the SaaS platform of the Esko Cloud and indeed, most cloud-based systems, ensures consistent development and new features. This in turn allows operational efficiency to be built into the core business strategy. The platform does away with the siloed approach of many packaging software systems, encouraging natural collaboration by opening up additional channels of communication. The Esko Cloud hosts innovations such as the dedicated palletisation optimisation software Cape Pack that enables critical up-to-the-minute information to be updated through Cape Cloud, turning palletisation into a flexible SaaS model capable of generating customisable reports with interactive 3D views of logistics design – all stored in the cloud network for easy sharing amongst the key stakeholders. The platform creates new collaboration possibilities between players across the supply chain.

"Software solutions can reduce the packaging development cycle from an average of six weeks to three weeks"

CONNECTING FRAGMENTED WORKFLOWS

Managing an increasingly complex packaging supply chain is made intrinsically simpler through active cloud road-mapping – moving fragmented and disconnected processes into a system that joins the dots organically. By focusing on cloud functionality as a key advantage for its customers, Esko centralises data flow and makes packaging production a more synergistic process. Collaboration and integration are core to everything the company does and is woven into the very fabric of Esko. It's this mode of thinking that makes Esko so passionate about making cloud-based operations accessible to its customers. The heightened workflow communication brings real value to the supply chain, stakeholders become connected to the process quickly and efficiently, accountability and visibility become clearer, prepress becomes more efficient and the overall business benefits as a result.

Cloud connectivity means that Esko solutions make it easier to use expert skills in workflows, however complex, even if completed from a remote facility. It is also simpler to move jobs to other sites when needed, in an effort to balance workload. The key goal for any business is to accomplish more with existing resources, which is exactly where cloud capability shows its true value. With a bird's-eye view of the industry, Esko is building cloud capability into its portfolio of software and hardware solutions to make this simple and efficient at every stage of the business.

FUTURE-PROOFING

Part of the ethos at Esko is to make future-proof technology not only accessible to its customers, but easy to source and intuitive to implement. Packaging converters aiming to reap the benefits of cloud workflows in prepress operations will find a full end-to-end suite of solutions from Esko.

Road-mapping for cloud integration into a business can be daunting, but Esko software solutions drive added value through the production supply chain without additional headaches. The company has developed an ecosystem of products that are designed to operate independently, but complement each other in combination, ultimately creating an environment of heightened business productivity.

As cloud technology continues to progress, it unlocks new opportunities for business process efficiency gains, particularly as the tools to develop cloud functionality mature. Notably, hosting services off site can offer benefits to start-up businesses as well as established, lowering the barrier to entry for many new and innovative companies that are vital to keeping the packaging industry moving forward. When a business invests in Esko solutions, it doesn't just buy in to the most up-to-the-minute technology, but an infrastructure designed to streamline the packaging supply chain on an operational level and truly harness cloud platform working for real bottom-line value. ■

Jan De Roeck is Director of Marketing – Industry Relations & Strategy at Esko

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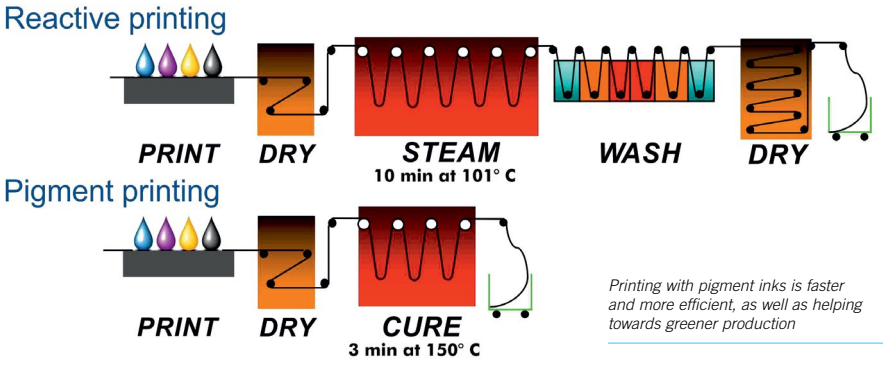
GAME CHANGER

Joachim Rees takes a closer look at water-based textile pigment inks, including the latest generation nano particle pigments, and the effect these developments are having on the fabric printing industry

Joachim Rees is Managing Director of Multi-Plot Europe



Printing with pigment inks is faster and more efficient, as well as helping towards greener production

Digital textile printing is a game changer technology for a global industry of 33,000 million m² per year of printed textile. After more than 20 years it has been moved from a start-up to a well established market with growing chance to take over the established market.

At this time the most popular print technology is the sublimation transfer printing. The printing process works on any kind of uncoated polyester fabrics and needs just a dry heat fixation progress without any steaming or washing. The printing production with transfer paper is clean, fast, inexpensive and has a low investment for hardware. For printing on cotton the most common way is to use reactive inks. Good workable inks with brilliant colours and a soft touch are the highlights. However, you need to prepare the cotton with a coating. After printing you need to steam and to wash it. The consumption of water and energy is very high.

WATER-BASED PIGMENT INKS

The alternative way to print on cotton is to print with water-based pigment inks. Traditional pigment inks are used for 44% of the global market. The market share for water-based digital pigment textile inks is less than 5% and I expect a boost of growth in the next years.

Sponsored by the Deutsche Bundesstiftung Umwelt DBU (German Federal Environmental Foundation), the 'Ecological Digital Textile R2R Printing using pigment inks' between Research Institute for Textile and Clothing (FTB) Hochschule Niederrhein and Multi-Plot sought to discover the facts.

"Water-based pigment inks are suitable for nearly all kind of fabrics"

For 100kg cotton you need 1,425 litres of water and 233kWh for reactive printing. You need no water and only 63.5kWh for pigment printing on cotton. The savings are up to 70% in energy. So pigment inks are a big sustainability advantage and help towards greener production.

A second big advantage of water-based pigment inks is the high UV-fastness for outdoor applications. All colours score 7–8 points in the Blue Wool Scale [which measures and calibrates the permanence of colouring dyes] – much better than reactive inks. Even most UV inks do not have this high fastness. So, pigment inks are very good for home textile and outdoor use.

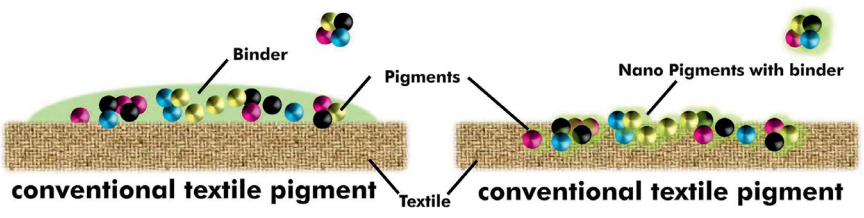
The disadvantages of the first generation of water-based pigment inks are a low colour gamut, low washing and rubbing fastness, hard touch and less stable runability at the inkjet printheads. Pigment textile inks of this generation need a binder system to fix the pigments on the surface of the fabrics. Compared to the brilliant colours of sublimation, the impression, especially in CMYK is poor.

All fabrics need a coating, for a washing resistance up to 40°C for an acceptable quality result. The fixation with dry heat can be made in a calander or stendering frame at 150°C. In the past, features varied from ink type to ink type and the market was not satisfied with the quality. Some of the inks were more like coloured glue and were closing the nozzles of the printhead.

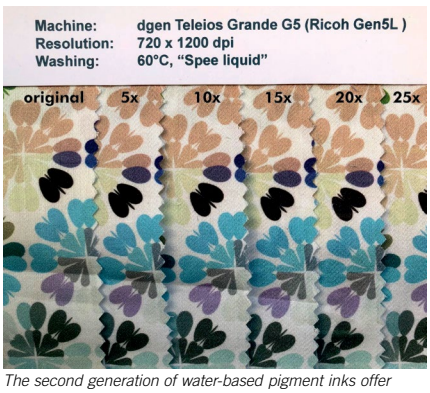
SECOND GENERATION – NANO PIGMENTS

Now we have the second generation of water-based textile inks, which we have been developing over two years, together with a German chemical company. A new type of nano pigments is the base of the new development. The pigment core is less than 250nm and fully encapsulated by the polymer binder. The new inks do not need a binder coating for cotton or natural fibres like linen.

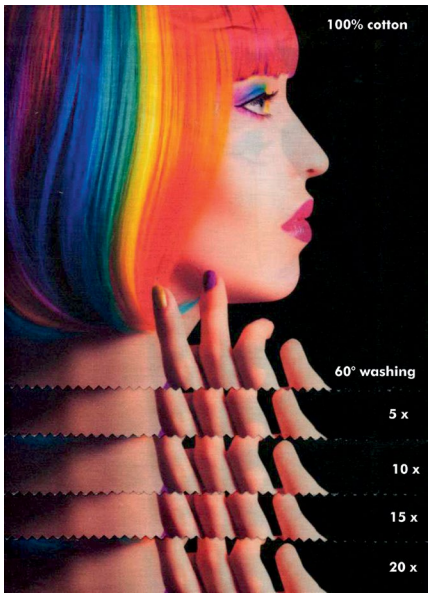
The ink is fixed inside and on the surface of the fabric. The washing test was positive



With nano pigments, the ink is fixed inside and on the surface of the fabric, precluding the need for a binder coating



The second generation of water-based pigment inks offer better colour-fastness after washing



Positive cotton washing test results over more than 20 washing cycles at 60°C

over more than 20 washing cycles at 60°C. The touch is very soft, because of no pre-coating. For a softer touch you can use a chemical softener.

For a great colour gamut, a set-up of eight colours is optimal. In addition to the basic colours CMYK, the colours orange, red, green and blue are available.

FABRIC OPTIONS

Besides printing on 100% pure cotton, water-based pigment inks are suitable for nearly all kinds of fabrics. Linen, viscose, tencel and modal all work well and are a good alternative to cotton.

Special mix fibres are very popular in the market and are compatible with pigment inks.

Because of the low fixation temperature of 150°C, water-based pigment inks can be used on different kinds of composite fabrics; for example, medias with polyurethane backing. The process also works on synthetic leather as well as real leather.

For fast-drying and sharp-contoured impression, a pre-coating is helpful. Many coatings for latex work well with water-based pigment inks.

NEW APPLICATIONS

One more application is to print on wallpaper or blue back paper [a white printing surface with an opaque blue back] for billboards. Clear, sharp lines and high resolution are in balance with a good colour space. The printing technology with Piezo printheads provides constant colour quality even for a big print volume in plain colours.

We also discovered some very special applications, such as printing on technical fibres. In Europe, at many public places, like airports, prints have to fulfil the regulations of A2 Fireprotection PN-EN13501-1+A1:2010. At this time many prints are printed on A2 glassfibre with UV inks. Unfortunately, most UV inks burn and smoke, so the certification does not work anymore.

Water-based pigment inks provide a solution which includes both: material and inks. Because water-based pigment inks are fire-retardant, they can be used print products for many new applications. Even the high tech fibre Nomex [a flame-resistant meta-aramid fibre] from DuPont can be printed. If you use a pre-treated Nomex fabric you can wash it and the colours are brilliant. The touch and feel of Nomex is like cotton and it's very popular for race suits and workwear for industry, police and military use.

In my eyes, we will have a lift-off with water-based textile pigment inks. Be part of the coming business and get into pole position for the race on fabric. ■

Joachim Rees is Managing Director of Multi-Plot Europe

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THE THIRD AGE OF PRINT

Economic, business, technological and social shifts are putting consumers in the driving seat. Gemma Glen forecasts how the 'Third Age of Print' will change everything from family mealtimes to workplace design

The print industry is now entering the 'Third Age of Print'; it's being driven by technology and commercial developments, but the ultimate beneficiaries will be the end customer, who will enjoy more choice and bargaining power than ever before.

Thanks to the technological advancements within the print industry, the way in which print is used in-store and in offices not only maximises a company's customer-base and growth, but also assures that precision, quality and agility is met at all times. The humble printer – print service, solutions, and other related products – is at the heart of this shift, which will have a profound impact in society from family life to the workplace.

FIRST AGE OF PRINT

The First Age of Print was characterised by limited services such as television, radio and telephone, delivered in a highly-regulated monopolistic (or near monopolistic) environment. Consumer choice was virtually non-existent; suppliers controlled everything from service delivery to pricing. Johannes Gutenberg's invention of the printing press is widely thought of as the origin of mass communication; it marked Western culture's first viable method of disseminating ideas and information from a single source to a large and far-ranging audience. Furthermore, in 1950, Xerox introduced a plain paper copier that made a whopping six copies per minute. Whilst the printing industry had to adapt with the times, it was becoming a vital part of the global economy[1]. Overall, print machines were rare to come across daily, outside the professional space, and proved as unaffordable to the average customer. This was the beginning of the First Age of Print[2].

The emergence of the 'open plan' office helped print to come into its own

SECOND AGE OF PRINT

The 'Second Age of Print' was heralded by the arrival of competition and – most importantly – the personal computer and office infrastructure. The former transformed the workplace, signalling the death of the typing pool and much of the hierarchy that accompanied it. The emergence of the 'open plan' office; a PC on every desk, and a workforce able to create and exchange content directly with whom they pleased are defining elements of the Second Age of Print. Furthermore, the print industry had seeped into various sectors by this point. Apart from print advertising, which was growing

OKI's compact C844 offers flexible, high-capacity, high-definition colour and fast print speeds

exponentially, there was a need for print within other consumer and automotive markets. Not only did printing become more sophisticated with improved quality, but the infrastructure became more advanced and capable of complex operations with varying levels of flexibility. Print finally came into its own.

During this period, technology was developing rapidly, and so were advancements within the print industry. Within the home, the average printer now became easily affordable to the consumer for the first time and therefore was also increasingly purchased for personal use. Printers were being used as connected devices to facilitate other amenities such as the fax, scanners and copiers. This was marked by the development of an all-in-one multi-function printer (MFP), in the late 1900s. Businesses were now able to reduce the amount of hardware in their offices and in turn, it proved cost effective. These multifunctional printers were also smaller, occupying less space in offices or homes, and became very popular amongst consumers.

THIRD AGE OF PRINT

Today, technology, economics and social changes are combining to provide more choice and competition than ever before; welcome to the Third Age of Print! The Internet of things (IoT), mobility, digital print services, smart homes and modern cities are all the result of these changes that typify the benefits of the Third Age of Print. For example, 3D printing has never been more popular and has been used to print a huge variety of different objects, including jewellery, clothing, medical prosthetics, food and houses[3].

Finally, big data is fuelling the shift in the volume and nature of information being exchanged. In the dawn of the digital age, printing got faster and more easily accessible to everyone. As the world becomes more digital, print firms have also now developed digital printing technologies to enable printing straight from a digital file. The print industry has extended its offerings as other solutions like web-to-print software become available, allowing information to be stored, sent and printed within minutes remotely[4]. For the busy consumer, these tools form an essential part of daily life.

The implications for print machines and print-related solutions are as clear as the opportunities they deliver: secure print solutions, scalable and multifunctional printers competitively priced. Today's consumers have never had more choice in terms of device, network and platform; whether they are securing their home from another location or downloading their favourite series, expectations in terms of service levels, device compatibility and security are unapologetically high.

The printers, scanner and fax machines – and queues of people patiently queuing to use them – will become obsolete as replacements emerge. The Third Age of Print presents a wonderful moment for the print industry. ■

To find out more visit www.oki.com/uk/printing/about-us/index.html

Gemma Glen is Product Marketing Manager at OKI Europe, NW Region

1 www.linkedin.com/pulse/part-i-evolution-printing-last-50-years-joshuah-goldberg/
2 https://dovetonpress.co.uk/history-of-print/
3 www.redbuscartridges.com/printing/evolution-of-printing/
4 www.instantprint.co.uk/printspiration/be-inspired/the-evolution-of-prin

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PRINT EVOLUTION

From democratising on-demand printing to assisting revolutionary 3D technology, Graham Kennedy envisions the role printing should fulfil in the future

Printing is evolving. Once confined to ink on paper, it now includes a host of new technologies and concepts that can give shape to almost anything imaginable. With its expanded reach it can offer innovative solutions for the environment, design and health.

So what role should printing fulfil in the future? Ricoh is working to answer this question by seamlessly integrating creative digital printing techniques into everyday life. One of the benefits of this is allowing personalisation to lessen the detrimental impact of manufacturing processes.

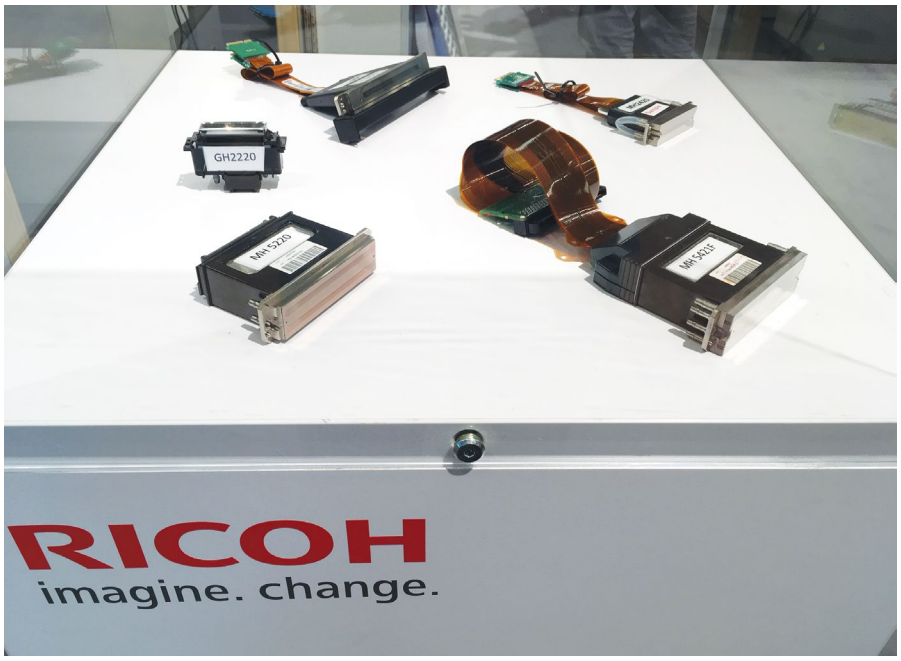
In the area of display printing, for example, digital processes have made on-demand printing cost effective at last. It is no longer prohibitively expensive to print in small batches with short lead times. This supports just in time delivery for a more responsive service delivery.

ADDRESSING RAPIDLY CHANGING TRENDS

In garment printing, on-demand production allows operations to keep up with the rapidly changing trends and rotating inventory of fast fashion rather than relying on the outdated methods of mass producing garments with long lead times. Taking an on-demand approach helps control inventory and decrease any surplus currently disposed of as waste.

The ecological impact of on-demand print is also playing a key role in the production of decor and building materials like wallpaper and flooring. Tons of wallpaper and flooring materials are discarded in landfills as trends change. Digital processes reduce this waste by enabling companies to produce only what they will actually use. On-demand printing requires digitisation. But, according to Ricoh's research, the digitisation rate is less than 10% for production processes in the textiles and building markets.

On-demand production allows operations to keep up with rapidly changing trends in garment printing



The technology used in Ricoh's inkjet printers is high-precision drop on-demand piezo-electric printheads

ENCOURAGING CREATIVITY

On-demand printing isn't only good for the environment and the bottom line, it also encourages creativity. The threshold quantity for production and profit is much smaller, encouraging the manufacture of one-of-a-kind designs at a reasonable cost.

The core technology used in Ricoh's inkjet printers is high precision drop on-demand piezo-electric printheads, versatile in ink compatibility for sign and display applications, but also in material deposition for the 3D market. Accelerated design and development speed has brought 3D printing technology into the mainstream; and printhead compatibility, with an expanding range of materials that can be jetted, including plastics, polymers, ceramics and metals, is now helping 3D printers to produce products in a wide range of fields such as automotive, medical products, and consumer goods.

Compared to traditional methods such as metal moulding and cutting, 3D print is highly flexible and suited to small-lot production. For these reasons the possibilities are expanding for new kinds of product creation, such as the manufacturing of order-made medical devices tailored to the patient's own body.

TISSUE BUILDING

By applying this technology to cells, it might be possible to develop a 3D bioprinter to output functional tissue, like building a house by stacking bricks. However, printing living tissue is not without significant challenges. Ricoh needed to modify the nozzle of the common inkjet printer to provide special conditions allowing cells to be printed like ink and in layers.

In addition, the inkjet heads needed to eject the cells without using heat or other potentially damaging methods, and the cells had to be positioned into layers. Nevertheless, Ricoh was able to develop and combine these central technologies into working cells, and it is now working on improving the precision of the cell-dispensing mechanism so that fully functional organs can one day become a reality.

Ricoh sees its technology as contributing to the production of functional, transplantable 3D organs and it is dedicated to making this a reality. For example, repairing a patient's injury with fresh human tissue or replacing a damaged heart with a perfect replica – one that was printed using technology similar to an office inkjet printer. The technology already exists to bioprint layers of living human cells, and Ricoh has successfully collaborated with Osaka University in Japan to create 3D pulsating cardiac tissue. 3D printing dramatically reduces the lead time and cost for these items.

"The technology already exists to bioprint layers of living human cells"

These are just some of the ways digital print is shaping the future and the evolution will continue as research and development addresses ongoing changing market needs. ■

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Multi-point monitors continuously measure UV intensity across the web, making it possible to generate a UV curing certificate for every batch

FULLY CURED

With total process control, it's now much easier to guarantee a consistent level of curing performance across a range of printing and coating applications, explains David Lyus

UV curing is an invaluable asset in the field of specialist printing; however, the technology does not always deliver an immediate and absolute solution for the user. The more complex and demanding curing processes often require a testing and development stage, alongside a good measure of expert advice from the system provider, in order to deliver proven and guaranteed results over the lifetime of the application. Complex challenges often require tailored solutions.

Many manufacturers and suppliers of UV systems can offer off-the-shelf curing solutions. However, few have the depth of knowledge, industry experience and engineering expertise to be able to design bespoke solutions for the printer, and to be able to guarantee a consistent level of curing performance across a broad range of printing and coating applications.

SPECIAL TREATMENT

UK-based manufacturer of UV curing systems has a Specialist UV (SUV) division that is focused on developing specialised industrial UV curing installations for the printing, coating and converting industries. The division oversees the design and technical development of solutions that are targeted at wide web applications, in areas as diverse as web coating and industrial printing.

GEW's NUVA2 is the workhorse of its range: a fully air-cooled UV curing system that is available for web widths of up to 250cm.

The system boasts the lowest total cost of ownership with a 30% energy saving, reduced plant air consumption and an immediate reduction in CO_2 footprint. NUVA2 maximises machine productivity; its fast-start lamp

Protective RHINO power supply and NUVA2 UV lamphead

technology offers consistent, high-speed curing and the system proactively avoids unplanned downtime. It is safe for use with the widest range of heat-sensitive materials. It is versatile and controllable, with no heat transfer to the machine or substrate at stand-by through the use of patented, actively air-cooled shutter technology. Furthermore, optically tuned reflectors maximise the lamps' curing effect. The system supports the fastest curing speeds, delivering the highest dose and

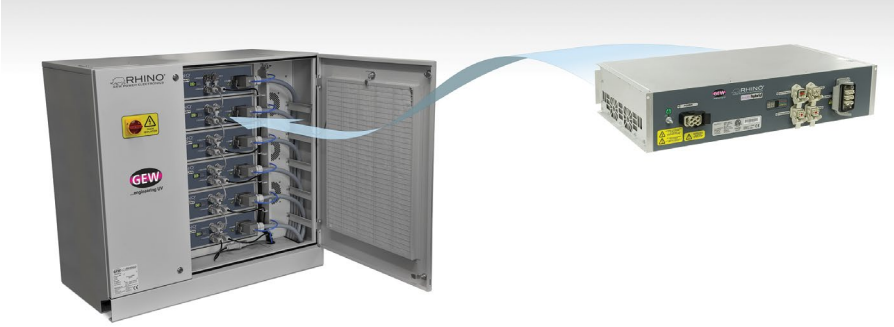
"GEW's NUVA2 system delivers the highest dose and intensity for maximum curing power"

highest intensity for maximum curing power.

Lamp changes are fast and simple, whilst all of the replaceable components in the lamphead are plug-and-play. Additionally, the airflow path minimises air consumption and contamination of the lamp and reflectors, which means that less cleaning is required to maintain optimum curing performance.

RELIABLE RHINO

The final element in ensuring the NUVA2's reliability is the RHINO electronic power supply unit, which protects the UV system from damage caused by incorrect voltage,



RHINO power supply cabinet

short-to-ground, dropped phases, mains spikes and lightning strikes. RHINO operates in harsh conditions at ambient temperatures of up to 40°C, whilst being unaffected by dust, ink mist and other atmospheric contaminants.

MULTI-POINT MONITORING

To avoid the risks and consequences of an under-cured product reaching the end customer, NUVA2 is available with GEW's multi-point UV monitoring (mUVm), which continuously measures UV intensity across the web. With this system it is now possible to attain 100% UV inspection and to generate a UV curing certificate for every batch, by recording live outputs for every lamp.

Furthermore, the new monitor is designed to comply with a broad range of European legislation on food contact packaging.

Working with GEW's precision-built lampheads, coupled with state-of-the-art RHINO electronics and next-generation UV monitoring technology, users are assured of total process control and reliability. ■

David Lyus is Sales Manager, Specialist UV Systems for GEW

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EMBRACING THE FUTURE

Looking ahead to drupa 2020, Régis Thienard asks 'what's next in inkjet' and examines the many reasons that make the technology attractive to printers

The overriding message for drupa 2016 was that inkjet is now ready for 'prime time' across a growing range of applications and well positioned to displace conventional printing methods. In 2016 we were supposed to 'touch the future' and in 2020 we should really 'embrace it' properly.

For 2020, everyone is guessing that drupa will signal the victory of non-impact printing. For me, 2020 will be another inkjet drupa. The success of inkjet derives from and is embedded in the very nature of the technology which can be looked at across its key elements.

CONTACTLESS PRINTING

Today, digital printing eliminates most of the inefficient downtime of a printing press; there are almost no more intermediate steps. The print service providers become more productive; they increase their responsiveness and they contribute to inventory reduction for their customers. The future of printing is set for digital and for inkjet. Xerography and offset can't go where inkjet can go with very large widths, printing on objects and fabrics. Inkjet technology allows printing without contact, eliminating the risk of distortion of the image or deterioration of the substrate.

No market is standing still for manufacturers and they all are redoubling their ingenuity to manage those tiny drops of ink. Whether it means the ejection-height compared to paper; the fragility of the [print] heads in terms of friction; their interchangeability; the speed of ink-ejection coupled with the preciseness of each drop's shape; the size and quality of the pigments; limitation of ink penetration into the substrate; or the improved drying of uncoated paper, etc.

We see many printhead suppliers (Memjet, Kyocera, Fuji, Xaar, Konica Minolta to name but a few) delivering higher resolution, higher speeds and lower costs. This all opens up new horizons. While heads previously only had moderate resolution and speed with limited application usage, we are witnessing an incredible development of new heads across many suppliers delivering high throughput and print resolution. Therefore, there are a lot of inkjet machine suppliers serving numerous markets from labels to large format, textiles, packaging and industrial printing. The growth here is significant and I am convinced that we are at a clear tipping-point for inkjet to become the dominant technology at drupa 2020. We will witness some revolutionary machines and see that there is almost no limit for inkjet.

drupa returns to Düsseldorf this summer [photo: Messe Düsseldorf/ctillmann]

SOFTWARE, AI & 3D PRINTING

While the printhead itself requires advanced technologies, the inkjet magic taking place is also thanks to other key ingredients recently available such as 3D printing, advanced software and Artificial Intelligence. These components are the ultimate tools to help in perfecting the inkjet machines, thus advancing their flexibility and accuracy beyond expectation. Some printhead manufacturers like Bobst Group Mouvent are using 3D printing technologies to integrate all the components into a small space, with the

"At drupa 2020, we will witness some revolutionary machines and see that there is almost no limit for inkjet."

The motto 'embrace the future' could well become 'embrace inkjet as the future' [photo: Messe Düsseldorf/ctillmann]

Announcements from Landa are setting the scene for inkjet to be the star of the show at drupa 2020 [photo: Messe Düsseldorf/ctillmann]

highest level of precision, delivering compact head-clusters for use across numerous technologies. Almost as simple as Lego bricks!

Adjacent technologies are truly accelerating the ongoing development of inkjet, itself invented many years ago. New algorithms help digital press builders in the search for nozzle failure; in the detection of air bubbles inside the head's ink tank; in achieving a constant ink-ejection rate coupled with the fineness of each drop; or with fly ink shot-correction by diverting to the jet adjacent to the missing jet, etc… In short you can say that Artificial Intelligence in advanced software is helping to remove imperfections in printhead engineering. The recently invented Industry 4.0 – which refers to machines which are augmented with wireless connectivity and sensors, connected to a system that can visualise the entire production line and make decisions of its own – is very much aligned to the principles of inkjet.

COLOUR IN ABUNDANCE

With presses having up to 12 colours and drop-size varying by a factor [of] 10, all colours are printable as the gamut is at the top of any printing system. It is no longer the human eye that judges and compares between the original and the output; it is the system which applies its own patterns. The announcements of Landa, in achieving close to 97% of Pantone and claiming that spot colours may eventually become something of the past, are setting the scene for drupa 2020 where we all expect inkjet to be the star of the show. The recently announced Bobst DigiColor technology also heralds the twilight of spot colours. All such announcements will please brand owners who will no longer have to rely on the mood and subjectivity of a press operator.

APPLICATION VERSATILITY

Inkjet technology has the potential to print on almost any substrate – from textile to packaging including direct to shape on many substrates. Current inkjet technology has not established a landmark across literally all that is printed, but there is no doubt that it will evolve further. In some areas inkjet is still in its infancy, for example in embellishing. Companies like MGI, Kurz and Scodix are opening up new areas and this is just the beginning.

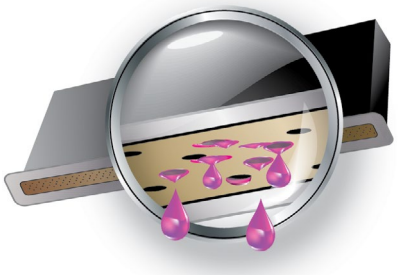
Inkjet is increasingly seen as an evolutionary driver of printing techniques and such evolution enables the printing of increasingly complex materials. The contactless nature of inkjet opens up myriad new markets such as glass, ceramics, tiles, even printed circuit-boards. We can be sure that drupa 2020 will bring such new applications to life. The motto 'embrace the future' could well become 'embrace inkjet as the future'. Disruptive innovations are on the move!

I expect drupa to showcase digitally printed books with integrated augmented reality and printed electronics; connected packaging delivery advanced safety features across the entire supply chain; fabrics with health sensors (tension, dehydration, etc…).

VARIABLE DATA, AGILITY & FLEXIBILITY

Brand owners and their agencies are expecting, even demanding, more personalisation and late stage customisation. They all wish the package to be the product. Some major players like Philip Morris International (PMI) expect digital printing to be at the core of their packaging production. Digital enables any packaging-item to be unique and done in seven days rather than 18 months. Moreover, as 'data' becomes the backbone of Industry 4.0, digital printing and

260,000 visitors from 188 countries attended drupa 2016 [photo: Messe Düsseldorf/ctillmann]



The contactless nature of inkjet opens up myriad new markets [image: drupa]

inkjet will by its nature cope with this new reality so whatever is printed can be all the same but also can be all different.

COSTS

Many claim that the limit of inkjet is linked to the cost of ink. Today, the manufacturer-research required to produce inks involves ongoing investments, especially as printheads are constantly changing and ink formulations must be adjusted. Whilst it's true that the development of inks for inkjet is more costly than for offset or flexo, it is just a question of time for inkjet to become more affordable and when its production volume surpasses offset inks it could indeed be at cost-parity.

SUSTAINABILITY

The acceleration of inkjet adoption also derives from the fact that it can be water-based with all the associated environmental benefits. HP in corrugated printing is making major claims about the sustainability of their inks especially for food packaging. Others will follow with water-based inks, as recently shown for example at Labelexpo 2020 by the Bobst Group with its up-to-100m/min Mouvent label press.

As I said in the introduction, drupa 2020 should embrace inkjet like never before. Inkjet is still a relatively new and fast-developing technology; the innovations taking place now and the ones to come will make it the dominant technology across all key printing applications and even beyond. So, as you prepare your trip to drupa in Düsseldorf, be open-minded and seek out especially the things that were not hitherto possible, because they will very soon be the 'new normal'! ■

Inkjet specialist Régis Thienard owns various inkjet patents and is one of the JETVarnish inventors. He is a Training Consultant at Jet d'encre

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A GREY AREA

Has inkjet really achieved offset quality? Not without a little help, says Martin Bailey, as he examines the complex interaction between components in an inkjet workflow and press

From about the middle of last year, the consensus seemed to be that inkjet had finally attained the same quality as offset lithography or flexography. You know how it is. You wander around a tradeshow and exhibitors are distributing wonderful colourful prints of German castles, big cats or piles of jewellery to show how their inkjet quality is superior to their competitors' press. People usually pull out their magnifiers and stare at the prints very closely.

What are they checking for? In most cases it seems that they know what makes a good offset or flexo print, and they're looking for that. However, inkjet is different from a conventional press and has distinctive strengths and weaknesses. If you're examining the detail in photographic images then modern inkjet will score very well, at least partly because most vendors usually use some form of dispersed screening (aka stochastic or FM), which can reproduce far more detail for the imaging resolution than a clustered or AM screen can. And when you add in greyscale heads that can place differing amounts of colorant in each location on the substrate, it gets even better.

THE SMALL PRINT

Now look at small text. Inkjet will often be printing at a lower resolution than offset, and much lower than high-quality flexo, and that has an impact on how well fine vector graphics can be reproduced. The ink technology used, in combination with how that ink reacts with the substrate also affects this area. Detail such as serifs in small text will look heavier (on UV or aqueous on coated stocks) or disappear completely (using aqueous inks on uncoated stocks).

In some print sectors, especially those with strong brand oversight or regulatory requirements, text is often converted to outlines in prepress, rather than using live fonts. But that will tend to make inkjet rendering even worse in comparison with conventional presses and increases the likelihood of very fine detail such as fine horizontal or vertical strokes disappearing completely, unless you're using a solution that's specifically tuned for common digital press resolutions.

MID-TONES

Another area in which inkjet has more challenges than offset or flexo is in printing relatively large and relatively flat regions of mid-tone tints. That's because inkjet has a tendency towards several different classes of non-uniformity in the output, which are typically split into microscopic and macroscopic: small and large artefacts.

Microscopic variations are often described as streaking, graininess, noise or mottling, and can occur for several reasons:

- drops coalescing on the surface
- heads being misaligned
- ejection timing not being quite right
- drops being disturbed by eddies in the air flow between the heads and the substrate
- ink shrinkage during drying or curing.

Macroscopic variations are the banding that you get along a single pass printer or across a multi-pass or scanning printer. The unevenness is caused by variations both within and between inkjet heads along the print bars in the press. This can be caused by:

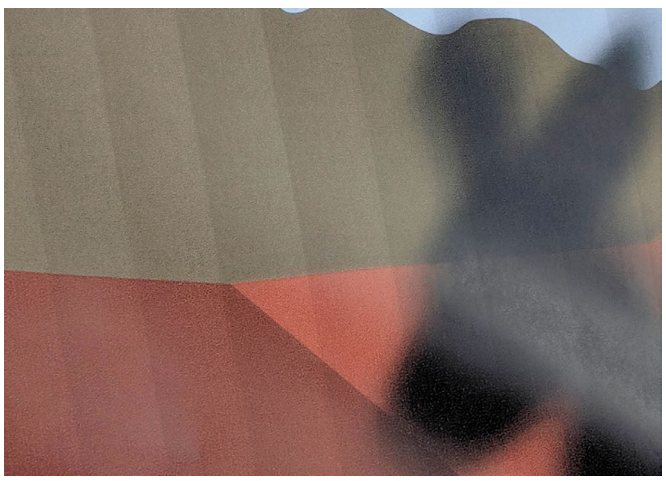
Banding problem shown on a section of a 'mega-light' wide format print before calibration in Global Graphics' PrintFlat software

- ink pressure and voltage changes across the head
- differences in manufacturing
- certain types of head/ink combinations wear with use; the more drops emitted, the more the head wears.

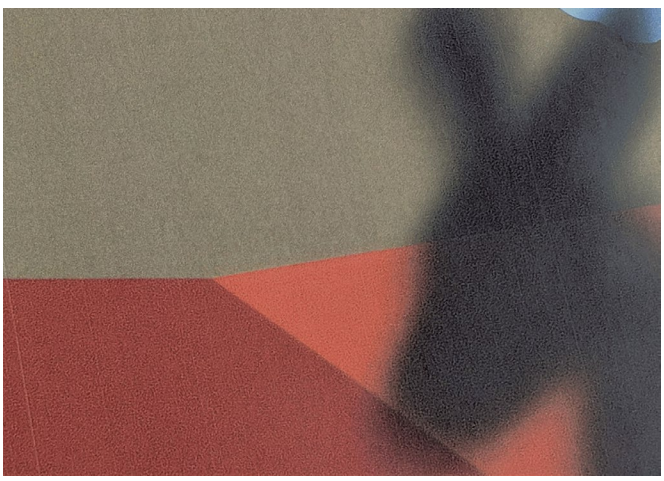
SOLVING THE PROBLEM

They are two very different things with very different causes. Most inkjet presses suffer from both to varying degrees. Where do you start to overcome them?

For microscopic non-uniformity, the first step is obviously for the press vendor to review their inkjet press design, considering ink



Close-up showing banding before calibration



Close-up of same section after calibration in PrintFlat is applied

formulation with respect to the substrates to be used: throw distance; wave form; ejection timing; etc.

But at some point, any improvements to the physical design start becoming more and more expensive, and improvements to ink formulation begin to counteract other requirements, such as the need for open-time, drying efficiency, etc. It's often not possible to engineer all microscopic artefacts out of the system at a hardware, ink and electronics level. Yes, you could do more trouble-shooting but it's just going to cost too much up front, it's going to delay your time to market and make the press too expensive to build.

The good news is that microscopic artefacts are often amenable to correction in software by using a specifically designed halftone screen; something that counteracts the directionality of the inkjet system that leads to drop coalescence and therefore to streaking; or that manages the ink shrinkage during curing and drying that leads to mottling and graininess. Global Graphics Software's Advanced Inkjet Screens are an excellent example of this kind of solution.

The most common cause for macroscopic non-uniformity, banding, is simply variations between and within inkjet heads. Pretty much every head design has this issue to at least some extent, and historically press vendors have countered it by careful selection of which heads will be used together, combined with adjustment of voltages for each head, or for each region of each head.

Those techniques certainly improve matters but tend to make it slower and more expensive to build each new press and complicate any situation where heads must be replaced on an existing press.

They also usually don't go far enough in correcting the banding. When Global Graphics starts to work with a new inkjet press vendor we discover that their customers (the printing companies and converters) turn away jobs that they know will not be sellable if printed with inkjet presses because of banding.

"Customers are turning away jobs that they know will not sell when printed with inkjet presses because of banding"

Once again, the most cost-effective, efficient and complete solution can be applied in software. Using PrintFlat technology we adjust halftones for every individual nozzle as they are applied to compensate for the tonal changes that will occur when the output is jetted onto the substrate. This is proving effective on many applications from high-speed single pass décor to the scanning heads used by Ellerhold AG [producer of indoor and outdoor advertising] for its wide format 'Mega-Lights' installations.

Of course, another aspect of the complex interaction between components in an inkjet workflow and press is that the solution for non-uniformity must be fast enough so that the press can run at full speed. Fortunately, that's not a problem with well-designed and highly tuned software on modern computers.

IN CONCLUSION

For now, it's my contention that inkjet has still not quite achieved offset quality, although technologies such as those from Global Graphics Software are certainly helping inkjet vendors towards that goal. When exhibitors hand out posters of a 50% of flat grey from their exhibition booths, I will be persuaded that the day has arrived because that's a perfect way of demonstrating that inkjet really has overcome the problems of variations in uniformity. ■

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MATERIAL WORLD

Ben Woodruff considers the rise of LED UV printing and the myriad of possibilities it brings, particularly to the textiles industry

What an ever changing world we exist in! Every day the acceleration of print technology is creating unprecedented advances in innovation and applications. Scarily it may only have been about 20 years since we were tied to the limitations of printing with plates or screens, but we are now seeing a massive blossoming of the LED UV printing market. The technology means the nature of applications is rapidly expanding with almost limitless possibilities. The only limit now is on the ideas created.

GETTING PERSONAL

We are surrounded by it – personalisation. From the adverts we view to the online searches we make, nearly every aspect of our lives is becoming tailored to our preferences. This trait is permeating and weaving into so much more of our environments as we come to expect it more and more. The rise of personalisation from birthday cards to bespoke gifts means that the continued rise of digital printing will only exacerbate this with shorter and shorter print runs becoming increasingly popular. Equally, we want to create customised pieces where items can come in a particular colour, or practical customisation such as creating sequentially numbered labels. So we now see ourselves entering into the realms of yet more bespoke and niche printing, with everything from customised musical instruments through to strangely beautiful personalised coffins!

"Printing on leather has become more accessible and increasingly popular"

REVOLUTIONISING THE OLD

Inkjet textile printing is still one of the fastest growing segments; doubling its value since 2013, with estimates at the tail end of 2018 highlighting that the worldwide market for textile printing had risen to $1.88 [£1.39] billion in 2018*. This dramatic, rapid evolution is showing no signs of abating as more printers and customers embrace what this technology can deliver. Offerings are broadening across the fashion, signage and the home décor sectors with some insights suggesting that the market could even grow to a value of $4.90 [£3.77] billion by 2023*. The typical sectors such as clothing, household, display and signage are likely to continue to dominate. However broadening of the sector is seeing technical uses and accessory applications becoming much more prevalent in other sectors such as automotive, medical and sports.

MAKING THE MOST OF THE MEDIUM

While the automotive sector may be suffering, it is also innovating in its application of LED UV printing. Some prestige manufacturers now have in-house large format printers that they can use to create bespoke interior finishes and printed trims on plastic, metal and leather for the discerning customer. This love of printing on leather has more recently

Individual sample boards being printed on a Jetrix flatbed printer

Layers of ink being used by an LED UV printer to create textured finish

become much more accessible and increasingly popular. Combined with custom printing, it is seen as a way of creating a more personalised style with designs printed directly onto the leather in bold, high definition colours. Digital printing means there is the ability to do very small runs of a design as there are no screens to prepare.

Some indications are that the textiles industry is increasingly moving to a lean and Just in Time (JIT) manufacturing processes where holding fabric stocks will become a legacy. On-site printers, particularly those that can print a pattern directly onto the fabric, are making it possible to print a fabric on the same day that it will be cut. This is also enabling businesses to go from the design stage to a finished fabric in weeks or even days if they have an on-site printer. The advantage of this is that textile industries are now able to respond quickly to current trends and even change their prints or colours mid-season.

CREATING DIVERSITY

The UV LED printing process is lending itself to creating many diverse applications as it broadens the extent and variety of media with which it can be used. The potential to creating new revenue streams is significant and now even extends to how a GUI [Graphical User Interface] is developed. Some of the latest printers have the ability to introduce layers of ink to create unusual 3D effect textures, adding a completely new dimension to projects. No longer will art prints or reproductions need to be smooth and flat in nature, as this layer approach can replicate the intricacies of an artist's brush stroke or enhance the texture of an image to create additional depth. In fact this creates another level of unique personalisation which can be adjusted for every piece, enabling customers to have a truly totally original and bespoke piece.

It truly is an exciting time in the application of UV LED printing with manufacturers and printers constantly looking at new ways to evolve. The future is therefore likely to be dynamic, potentially a little unpredictable but realistically a time for significant innovation. ■

**Source: https://www.smitherspira.com/industry-market-reports/printing/digital-textile-printing-to-2023*

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LET'S STICK TOGETHER

Do hybrid inkjet label solutions offer the best of both worlds? The result is more powerful than separate analogue and inkjet processes, believes Paddy O'Hara

Paddy O'Hara is IIJ's Business Development Director

For those looking for short run label solutions, digital technologies have always been attractive. Both toner and inkjet solutions have long heralded a digital revolution, but whilst it is now commonplace, it can never replace analogue technologies, only enhance and improve it. That's why at Industrial Inkjet (IIJ) we like to refer to a digital evolution instead.

Short run colour self-adhesive labels can be produced using IIJ's ColourPrint HiQ engines

Hybrid technologies are now in vogue, but are they really the ideal solution and the answer to all applications? As with everything, it depends on your circumstances. There are several things to consider:

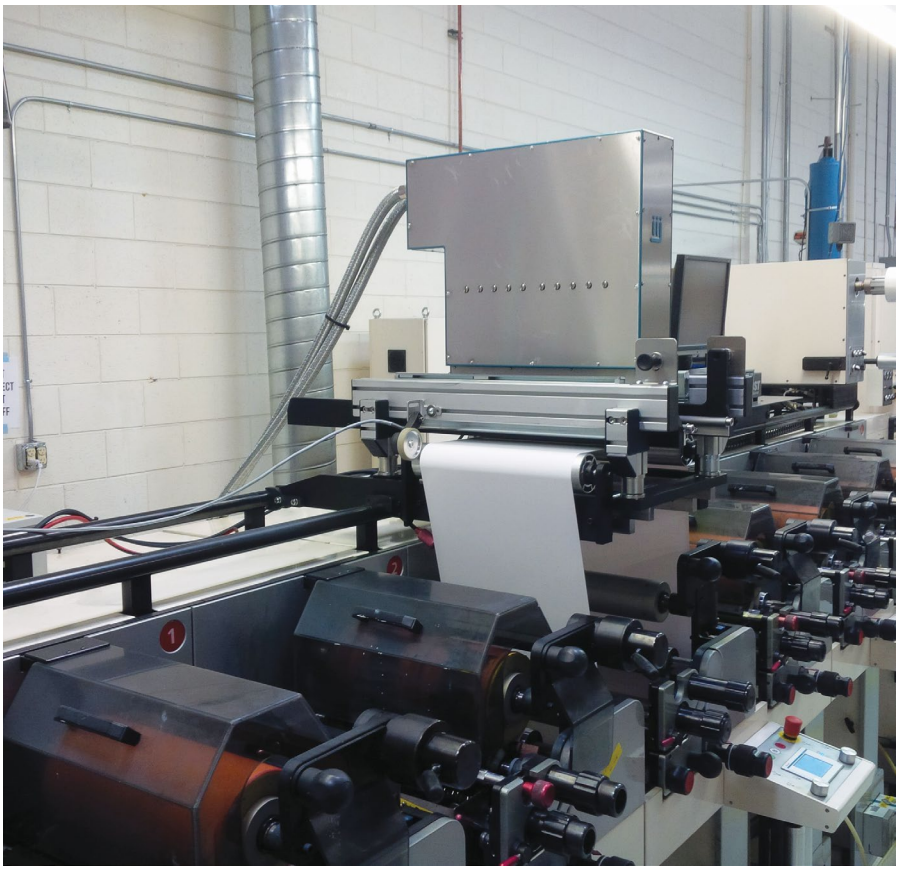
1. TYPE OF WORK

If you are simply producing coloured labels with minimum finishing requirements, such as die cutting and lamination, then maybe an offline or near-line digital solution works – although you still may not benefit from reduced stock levels as the digital rolls need to be stored prior to finishing. If you are producing complex labels that need additional processes such as low cost flexo background and spot colours, foiling, varnishing, embossing etc., then an on-press inline solution is the perfect way. Putting one of IIJ's ColourPrint HiQ modules onto an existing flexo press gives the user the power to include variable high-resolution colour images and text on multi-process labels.

2. MATERIAL WORKFLOW AND SPACE REQUIREMENTS

For a small label company, adding another piece of standalone hardware for near-line production can be problematic and lead to additional costs of ownership; there is the extra space, services, staff, and storage of WIP etc. This is where hybrid solutions score well, particularly solutions that do not require extensive surgery on the press or require the press to be extended. Using Konica Minolta's high resolution KM1800i printheads, IIJ's in-line inkjet modules are some of the most compact on the market, allowing high quality digital label capabilities to be added to an existing press (without removing multiple flexo stations). A compact

"Reducing the speed of inline production undermines the value-add of a digital solution"



IIJ print engine on a flexo base

footprint along with high efficiency LED curing allows the IIJ system to be used exactly when and where it's needed, especially on rail mounted press adaptors.

3. LABEL MATERIAL

Many inkjet label systems require specific label stocks that are more expensive than flexo stocks and do not always lend themselves to some of the additional processes. With an on-press solution, low cost primers can be added inline so standard stocks can be utilised, saving money and reducing stock inventory.

4. PRODUCTION SPEEDS

The press speed is governed by the slowest process, and for a long time inkjet solutions have been offered at between 25 to 50 m/minute. Reducing the speed of inline production undermines the value-add of a digital solution and can make offline or near-line solutions look more attractive. But what if the inkjet solution is run at 80 to 100 m/min or even 200m/min for monochrome variable data? Then the on-press inkjet solution is no longer the limiting point. IIJ label modules typically operate at 80 to 100m per minute, and for text and variable data, offer speeds from 100 to 200m per minute.

BEST OF BOTH WORLDS?

A supplier of hybrid technologies since 2010, IIJ believes that by evolving the analogue label production process through innovative use of inkjet, the result is much more powerful than the separate processes alone. Short run colour self-adhesive labels can be produced using IIJ's high resolution ColourPrint HiQ engines suitable for premium labels used in the food and beverage sector, personal care such as shampoo and cosmetics, nutraceutical labelling, and labels for consumer goods. For industrial labels, coding and marking labels, including security labels, the MonoPrint series really hits the spot.

Clothing swing tags and RFID labels are also easily produced by combining our variable data capabilities with our latest colour management capabilities, giving accurate spot colour identifiers required in this market. If migration and set off concerns exist for an application, IIJ also has a range of solutions using low migration inks. ■

Paddy O'Hara is Director of Business Development at IIJ

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HANDLE WITH CARE

Frank Toma reviews Dangerous Goods Regulations. How do they stand to affect screen printers? There's a chance you could be at risk, and not even know it…

Frank Toma, Chairman of ESMA's Health, Safety and Environmental Protection Committee

Talking with screen printing companies, most of them are quite aware that they handle materials which are subjected to chemical legislation and are considered as dangerous substances. However, many of them are not so aware that they are also subject to Dangerous Goods Regulations.

In case you are wondering what the difference is: dangerous substances are regulated by REACH [Registration, Evaluation, Authorisation and Restriction of Chemicals] and CLP [Classification, Labelling and Packaging]; the focus is on handling the chemicals. Dangerous goods are regulated by transport agreements like the ADR ['Accord Dangereux Routier' – European agreement concerning international carriage of dangerous goods by road] or the IMDG [International Maritime Dangerous Goods] code and therefore the focus is on the transportation.

TRANSPORTING DANGEROUS GOODS

It is easy to assume that, when running a screen printing company, there might be a lot of exposure to dangerous chemicals like flammable solvents, harmful or irritant inks, corrosive de-coaters and others. But what does a screen printer have to do with dangerous goods? Well, while the products are usually out of scope of the Dangerous Goods Regulations, the raw materials – inks, cleaners, solvents – are not. You might say: "But we are not involved in the transport; we just receive these materials". Perfectly correct, but receiving a delivery is still a part of the transport. That means, that when receiving dangerous goods, one has obligations to fulfil. Unloading of goods is not permitted if it puts workers involved at risk (e. g., if a drum containing solvent has leaked).

Another obligation might arise when disposing of waste materials like used solvents or used cleaning cloths. If the materials involved fall under the Dangerous Goods Regulations – you

"Receiving a delivery is still part of the transport of dangerous goods"

can find the appropriate information in chapter 14 of the Safety Data Sheet – the transport containers have to be labelled accordingly. A delivery note with the relevant dangerous goods information must be provided for the driver of the transport. And not only the driver of the transport, but also the shipper has to ensure that the goods are well secured against unintended movements during the transport.

STAY VIGILANT

The Dangerous Goods Regulations are revised every second year. Accordingly, employees to whom this information is relevant must be instructed about all the applicable duties at least every second year.

Finally: Dangerous Goods Regulations duties are not usually addressed to a company, but to persons in the company, and fines for violations are quite steep.

For all these reasons it might be a good idea to check how your company organises the transport of dangerous goods. ■

Frank Toma is Chairman of ESMA's Health, Safety and Environmental Protection Committee, and Safety Officer at ENVISAFE Consulting

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Further information:
https://esma.com/images/downloads/news/14th_ATP_to_CLP.pdf

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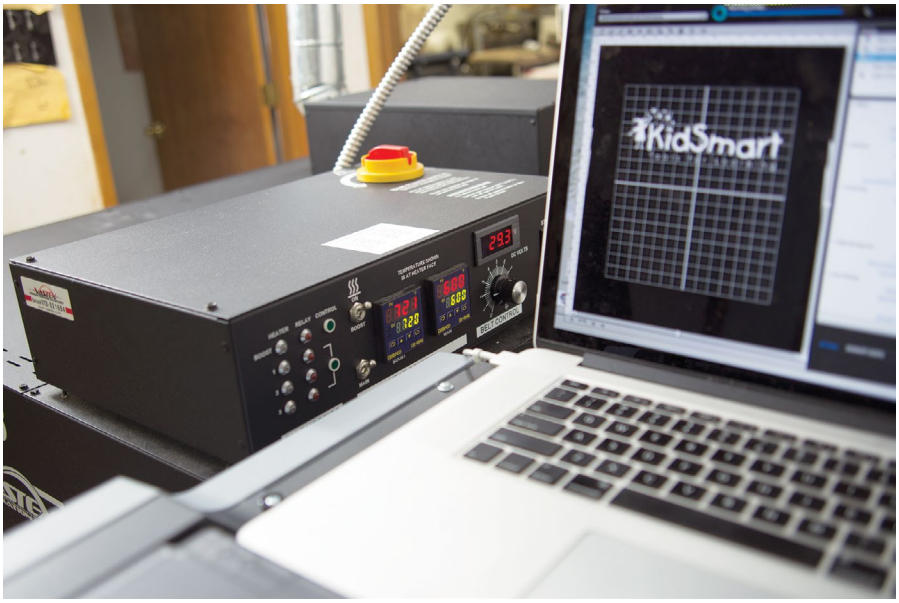
THE HEAT IS ON

Mark Vasilantone explains how a small offset printer grew to become an advanced, full–service print shop by using a DTG dryer to boost quality and capacity

Founded in 1978 by Mirko Coric, C&C Quality Printing, Inc. has grown from a small offset printer to an advanced, full-service print shop. The company is now run by Mirko's son, Maximus Coric, who says that C&C's 'mom-and-pop' mindset has never changed.

He points to an example on press: fourth-generation wedding invitations for a family that first came through C&C's doors in the late 70s. "We printed wedding invitations for the great-grandmother, the grandmother, the mother, and recently for the daughter," says Coric. "Our tagline is 'welcome to the family,' and it's the family nature of our business that allows us to build trusting relationships with our customers."

In the early 90s, the father-son duo began to diversify, branching into vinyl cutting and vehicle graphics. Next, C&C purchased a manual screen printing press and began printing yard signs, T-shirts, and other garments. As print technologies advanced, the shop added one of the first direct-to-garment (DTG) printers.



C&C Quality Printing capitalises on the versatility of direct-to-garment (DTG) ink jetting of water-based inks

DTG PRINTING EXPANDS OPTIONS

Coric considers manual screen printing ideal for identical designs consisting of one or two colours: "It captures economies of scale and scope to make the per-piece cost extremely low," he explains. "The more you print, the more you save."

Conversely, he says multicolour garments were more time-consuming and costly to produce on the manual press because they required pre-press equipment to produce a screen for each colour.

To better customise orders and print on demand, Coric purchased a DTG inkjet printer. After processing the artwork on a computer, the design is printed directly onto the surface of the garment using aqueous-based pigmented ink, which the garment's fibres absorb. DTG printing allows for thousands of colours and gradients, making it suitable for printing of full-colour photographs.

"DTG printing is very versatile," declares Coric. "Since there are no screens, each graphic is sent to the printer digitally, so you can have variable data in the form of several different files. We have the flexibility to print 100 shirts with 100 different prints, and we're able to charge more because people want that customisation."

"The heating process turns the pigment into a gas that permeates the pores of the shirt, thereby setting the image that much better"

Three 61cm-wide infrared heaters are height adjustable, allowing images to be positioned at an optimum distance from the heaters regardless of garment thickness

DRYER CORRECTS COMPROMISED CURING

"Printed shirts looked amazing when they came off the inkjet printer," recalls Coric, "but when they were transferred to the heat press for curing, the press muted the colours and made them look muddy. I had to sell them at a discount just to get rid of them. I knew there had to be a better way to cure the shirts."

Then at a trade show, Coric saw a demonstration of an infrared conveyor dryer developed specifically for DTG-printed textiles called a 'LittleRed X3D'. He purchased the dryer and achieved a three-month payback: "Because our shirts looked great, we were able to command higher prices for them", he explains.

Manufactured by Vastex International, the dryer can cure screen printed plastisol, water-

Continued over

Developed specifically for DTG-printed garments, C&C's conveyor dryer preserves image sharpness and colour vibrancy

based and discharge inks, but it offers a 'pre-heating' function that also allows rapid curing of white water-based inks printed digitally, including garments simultaneously pre-treated on Kornit machines.

"In the minute that it took to cure one shirt on the heat press, the DTG dryer can cure six to eight shirts"

The unit's key difference is an intense pre-heating zone that surges the ink temperature to over 149ºC (300ºF) within the first several inches of conveyor travel, maximising the time the image spends at its optimum curing temperature before exiting the heating chamber (see box).

The dryer is equipped with a 76cm-wide conveyor belt with three 61cm-wide infrared heaters that are height adjustable, allowing Coric to position images at a consistent distance from the heaters whether printed on T-shirts, sweatshirts or sweatpants.

"I used to have to wait for the heat press, and had to buy a second one just to keep up with the digital printer," says Coric. "Now, with the high-density infrared dryer, we're waiting for the shirts to come off the printer.

"The maximum temperature of the heat press was about half that of the LittleRed's temperature," reports Coric. "Now, we're able to heat the shirts up quickly. The heating process actually turns the pigment into a gas that permeates the pores of the shirt, thereby setting the image that much better."

DTG-printed shirts looked great coming off the inkjet printer but former heat pressing muddied the colours

CURING DTG DRYING PROBLEMS

Because DTG-printed images are extremely wet, they do not begin to dry quickly until they reach approximately 149ºC. To raise the ink to this temperature as rapidly as possible, Vastex' X3D dryer features a pre-heating section that exposes the ink to intense heat within the first few inches of conveyor travel. By shortening pre-heat time, the amount of time the ink is exposed to its optimum curing temperature is lengthened, allowing conveyor belt speeds and drying rates to be maximised.

In the minute that it took to cure one shirt on the heat press, the DTG dryer can cure six to eight shirts. Most important to Coric, however, is enhanced quality. "Ink adhesion has improved and designs are clear and crisp with vibrant colours," he notes.

QUALITY SHIRTS BOOST SALES

C&C Quality Printing has occupied the same 186m² retail space since 1992 – just six doors down from its original location. Despite the company's expansion, Coric says he has no plans to move to a larger facility. "We want our customers to feel comfortable with us," he states. "They know where to find us, and they know when they come to the store that we're there for them."

In addition to the DTG printer and the infrared conveyor dryer, Coric's shop has three digital high-speed printers, a latex printer for large-format printing, embroidery machines and a binding department, as well as creasing, cutting, perforating and UV coating services. He also offers offset and screen printing services at an off-site facility.

The infrared conveyor dryer could be used for other curing purposes in the future or Coric may purchase a second unit for use at his screen printing facility. But for now, the X3D dryer remains tethered to the DTG printer.

"For us, the dryer brought life to DTG printing," believes Coric. "We're able to get those bright, vibrant colours, and they stay that way. It's gained a lot of attention, and it's bringing in more customers. Before, it was hard to sell the shirts. Now I'm able to command a premium." ■

Mark Vasilantone is President of Vastex International

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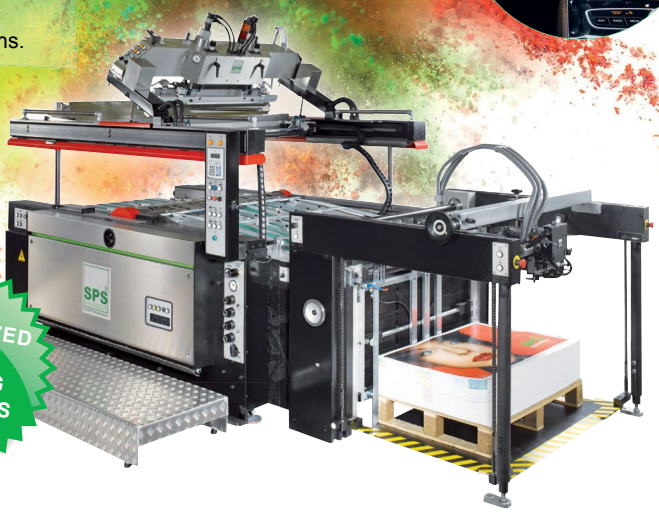

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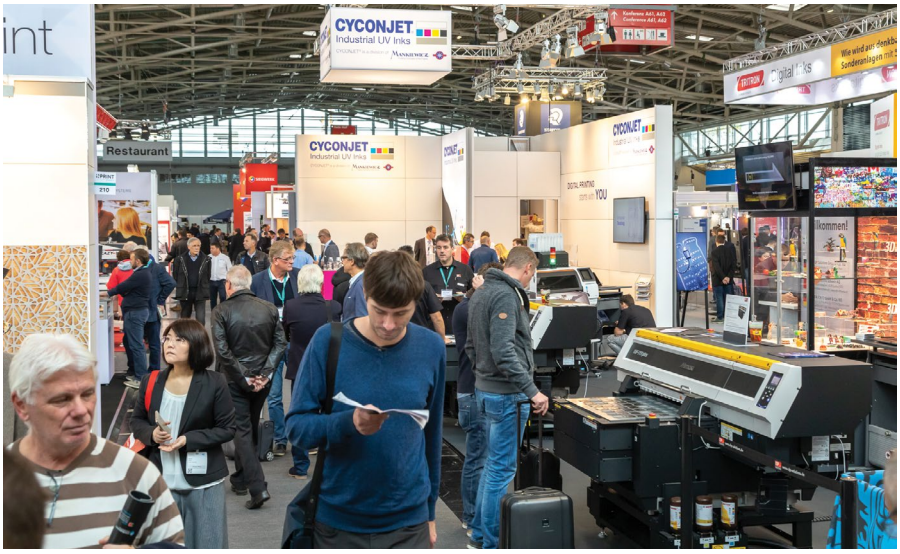
INPRINT MUNICH 2019 REVIEW

Visitors from 60 countries descended on Munich in November 2019 for three days of expert talks, new business and effective solutions at the exhibition of print technology for industrial manufacturing

During 12–14 November 2019 InPrint Munich offered a highly targeted platform for 136 exhibitors from 22 countries to get in contact with integrators and users of innovative print technology in a wide variety of manufacturing sectors, ranging from automotive, medical devices, interior design and electronics to plastics, textiles, packaging, and many more.

A total of 2,755 visitors from 60 countries attended the show to discover printing machinery, printheads and components, inks, fluids and chemicals, UV technology, drying and curing equipment and services for printing on different surfaces, materials and shapes. The majority of visitors were from Germany; other major visitor countries included Italy, Austria, Switzerland, the UK, the Netherlands, France, Poland, Slovenia and the Czech Republic. Visitors from outside Europe mainly came from Japan, the USA and China.



A total of 2,755 visitors from 60 countries attended InPrint Munich 2019 © Photo: Messe Düsseldorf, Constanze Tillmann.

HIGHLY TARGETED

"At this year's InPrint Munich we could see that the industrial print sector has developed further and is moving forward in the right direction. The industrial print community has clearly emerged from its experimental phase, now offering effective solutions," explained Nicola Hamann, Managing Director of the organisers, Mack Brooks Exhibitions. "Practical applications and custom-built systems as well as profitable business models were the focus of both exhibitors and visitors at this year's event. Print technology providers met with integrators and manufacturers who were looking for specific solutions to enhance their production process, develop their business or serve new market segments."

Exchange of expertise on finding the right approach for complex integration projects was also the major topic outside of the exhibition stands. A three-day-conference consisting of a technical stage and an application stage offered case studies, technical talks and panel discussions held by more than 70 different speakers. The new Consultancy Corner proved a success, with some 40 participants making use of this new service. In one-to-one sessions, independent experts offered free


Exhibitors praised the high quality of the specialist and targeted visitor audience and the innovation-based concept of the show © Photo: Messe Düsseldorf, Constanze Tillmann.

A three-day-conference consisting of a technical stage and an application stage offered case studies, technical talks and panel discussions © Photo: Messe Düsseldorf, Constanze Tillmann.


Show feedback revealed visitors were seeking solutions for functional as well as decorative printing applications. © Photo: Messe Düsseldorf, Constanze Tillmann.

InPrint Munich offered a highly targeted platform for 136 exhibitors from 22 countries © Photo: Messe Düsseldorf, Constanze Tillmann.

advice and guidance on how to integrate print tech solutions into their specific industrial manufacturing environment.

VISITOR FEEDBACK

A first analysis of the exhibition survey showed that both exhibitors and visitors particularly valued the specialist profile of the show, the high quality of the products and systems on display, the comprehensive educational programme as well as the expertise of the audience.

Many exhibiting companies stated that they had made new business contacts and led in-depth conversations with visitors at their stands. They praised the high quality of the specialist and targeted visitor audience and the innovation-based concept of the show.

The visitor survey showed that visitors were mainly from a variety of manufacturing sectors and print service providers. Visitors from the printing industry were professionals of digital, screen, inkjet, flexo and specialist printing applications. Visitors from the manufacturing industry covered a large variety of sectors such as packaging, plastics, electronics, the automotive industry, surface treatment, textiles, fashion and accessories, glass and ceramics, floorings and interior design, decals and front panels, food and beverage, medical devices, consumer goods, and many more. They were seeking solutions for functional as well as decorative printing applications.

InPrint returns to Munich, Germany in 2021. This year, InPrint will be held in Milan, Italy, from 22–24 October 2020. InPrint Milan 2020 will be co-located with Viscom Italia, the International Trade Fair on Visual Communication. ■

Practical applications and custom-built systems as well as profitable business models were the focus of both exhibitors and visitors at the 2019 event © Photo: Messe Düsseldorf, Constanze Tillmann.

Further information:
web: www.inprintmunich.com

FESPA PREVIEW Q&A

What can visitors expect from a visit to FESPA Global Print Expo 2020? FESPA CEO Neil Felton provides answers and explains this year's theme

FESPA Global Print Expo 2020 will take place from 24–27 March 2020 at IFEMA, Feria de Madrid in Spain, covering digital, textile and screen printing. Alongside the event will be two co-located events: European Sign Expo, which will focus on non-printed signage, and an all-new sportswear manufacturing event, Sportswear Pro.

Filling five halls, over 500 exhibiting brands are expected at this year's event. Attendees will have access to an array of solutions from major industry suppliers and more niche exhibitors, all under one roof.

With a programme of free educational and inspirational features at FESPA Global Print Expo 2020, visitors will also have the opportunity to polish up on their colour management knowledge in Colour L*A*B*, see the whole garment manufacturing process in Print Make Wear, explore the latest industry trends in our Trend Theatre, watch the live car wrapping action at World Wrap Masters, and explore our creative Printeriors and FESPA Awards showcases.

The theme this year is "Where Colour Comes Alive". Can you explain what this means?

Neil Felton: Having travelled to many print industry events myself, there's one thing that sets FESPA Global Print Expo apart as soon as you walk through the doors – colour.

And whether we're talking about colour management, media, inks or finishing techniques, 'colour' is a powerful theme that expresses the boundless opportunities in our vibrant industry, from signage and graphics, to textile and garments, to interior decor.

Representing the energy, personality and entrepreneurial spirit of the global print community that congregates at FESPA Global Print Expo, there is no better theme than colour for 2020. And what better place to explore colour than in the vibrant city of Madrid?

Over 500 brands will be exhibiting at FESPA 2020

*This year's Colour L*A*B will focus on device profiling, process control and standardised viewing conditions*

Can we expect any new technology launches during the show?

NF: At this stage, [at time of writing] it's too early to comment on preview news from our exhibitors, but in previous years FESPA Global Print Expo has always been a hub for significant global launches by major industry players, with a growing emphasis on solutions for textile printing.

With over 500 brands exhibiting at FESPA 2020, we're expecting the event to continue to be a platform for major product innovations, and many exhibitors are already signalling that FESPA will be a key product launch platform for them in 2020.

Please can you tell us more about the features at FESPA 2020? How have these developed since last year?

NF: Now in its second year, Colour L*A*B* will be returning in 2020 following its successful debut at FESPA Global Print Expo 2019. Tying in with the overall 'colour' theme, Colour L*A*B* will offer visitors a comprehensive overview of all individual elements that contribute towards professional colour management, with this year's edition focussing on device profiling, process control and standardised viewing conditions.

Linked to our host city of Madrid, our Printeriors interior décor design feature will combine video and photographic imagery of the Madrid Royal Botanical Garden, providing an immersive experience for visitors. Once again, we are collaborating with creative photographer Jasper Goodall on the designs and using a mix of sustainable fabrics and materials.

Our Print Make Wear fast factory feature will also be back for 2020 but this time will focus on sportswear, linking to our new co-located Sportswear Pro event. Print Make Wear 2020 will showcase the live end-to-end production process for sports and athleisure garments.

I love the energy and pace of the World Wrap Masters vehicle wrapping competition, and this year will see a reinvigorated display and an all-new scoring system. We're excited to see the re-designed feature elements come to life and to meet the winners from the regional qualifiers.

Nothing says 'colour' like a glamorous awards ceremony and our FESPA Awards will return with two new categories – 'wrapping' and 'Printeriors' – recognising the dynamic growth and development of both applications. The shortlisted entries will be on display at the show directly opposite Printeriors display and the winners will be announced on 25 March at Real Fabrica de Tapices. The choice of the historic Spanish royal tapestry factory as the venue for the Awards presentation makes for a very special link to the textile industry.

European Sign Expo will once again be co-located with FESPA

What are the trends worth highlighting? How will these be reflected in 2020?

NF: The finding of the most recent FESPA Print Census revealed that 84% of respondents from the FESPA Community are involved in textile print. Having investigated those figures further, it became clear that the top performing segment within the wider textile printing industry is sportswear manufacturing.

This presented a great opportunity to enhance FESPA's offering to our visitors, especially those interested in the manufacturing side of sportswear, such as design, production and decoration. Hence the introduction of the dedicated Sportswear Pro event, and the focus on sports and athleisure wear within the Print Make Wear feature.

Secondly, as in previous years, a key trend within the speciality print industry is sustainability. This will be reflected in a selection of our Trend Theatre conferences over the course of the event. Sustainability will also be a strong theme across all of our educational features.

Process automation continues to be a dominant topic too, as is the importance of colour consistency as our visitors increasingly work with a more diverse range of materials, inks and production processes.

The Trend Theatre programme will feature over 40 sessions, compiled with the interests of our global print community in mind. With an expert speaker line-up and a host of topics on key trends such as automation, colour management and DTG printing, there is something for everyone.

The last FESPA in Spain was in 2012. In your opinion, how has FESPA changed over the last eight years?

NF: The show has developed significantly since our last show in Spain, both in size and scope. In 2018, we launched our new event strategy and the change in cycle to a yearly Global Print Expo. The last time a FESPA show took place in Spain, in 2012, it was a FESPA Digital event, meaning that the show was focused purely on digital print technology. FESPA Global Print Expo is a far more comprehensive overview of the technologies, processes and applications being used across the global speciality print sector.

There will be greater focus on sports and athleisure apparel in Print Make Wear, and a new co-located Sportswear Pro event

The exhibition will also invigorate the rich content associated with our Global Print Expo, including Printeriors, Print Make Wear and Colour L*A*B*.

And with the co-located European Sign Expo and Sportswear Pro events, we are able to deliver the richest possible experience to our visitors while expanding the audience of the event.

"Whether your key interest is in technology, inks or materials, there will be a range of inspirational products on display"

How do you think visiting the show will benefit our readers' businesses?

NF: FESPA Global Print Expo is a key exhibition for the industry and the only event dedicated to speciality print including screen, digital, textile and industrial. It provides an opportunity to explore the innovations of over 500 brands under one roof.

As the meeting place of the global speciality print industry, it is a great opportunity to network with industry peers and be inspired by our exhibitors and show features.

Whether your key interest is in technology, inks or materials, there will be a range of inspirational products on display from both leading global brands and smaller businesses, making the Madrid show the leading destination in 2020 for European garment printers and decorators, speciality print service providers and sign-makers.

What do you think will be the highlights of this year's exhibition?

NF: One of this year's highlights is that visitors are getting three shows in one. Whether you are interested in print, signage or garment production there is something for everyone.

As in previous years, our extensive feature programme will be a highlight for the event. It is great to see a high level of engagement from our visitors year on year and we are looking forward to seeing how these features evolve for 2020.

Personally I am always excited about the platform that FESPA offers for technology innovations and I'm looking forward to hearing all about the products that will debut at FESPA 2020 and the future impact they have on the industry.

To register to attend FESPA Global Print Expo 2020, visit the website (below). For free entry use code FESM213, which will also grant you access to co-located shows European Sign Expo and Sportswear Pro. ■

The 2019 FESPA Global Print Expo welcomed 20,780 individual visitors from 137 countries over the course of four days

Further information:
web: www.fespaglobalprintexpo.com

IJC ON A HIGH FOR 2020

Following a sixth successful show in autumn 2019, The Inkjet Conference is already planning its next conference

The Inkjet Conference (TheIJC) is enthusiastically looking forward to its 2020 edition of the event. Held over 29–30 October, last year's IJC attracted over 500 experts from the world of digital printing and featured an all-time high of 63 presentations, including all major printhead manufacturers. TheIJC also provided updates on core technology ahead of the upcoming drupa.

VALUABLE FEEDBACK

"A tremendous opportunity to meet and discuss inkjet with people I don't normally see at traditional trade shows." – *Marc Johnson, Memjet*

"An exceptional conference for digital printing, where you have to be. It offers the best opportunity to meet all the information and contacts of the inkjet world in one spot." – *Frank Huppmann, Koenig & Bauer Kammann*

"Extremely valuable event that really helps us keep abreast of key technical and market developments in this fast moving area." – *Andrew Grantham, Lubrizol*

"I love TheIJC. It is one event I have not missed since its inception. I have attended all of them and find them to be informative, technical adept, thought provoking and in many cases technically candid." – *Neerav Goswamy, AT Inks*

"Whether people were working in small, medium or large firms, or in academia, TheIJC provided a relaxed community environment where people passionate about the future of print could talk about successes and upcoming challenges in the industry." – *Ronan Daly, University of Cambridge*

TheIJC returns to Düsseldorf on 27–28 October 2020 and the call for papers is now open. ■

Visitors stand to benefit from the sharing of key technical and market developments © Photo: Messe Düsseldorf, Constanze Tillmann

Further information:
web: www.theijc.com

Over 500 experts from the world of digital printing attended TheIJC 2019 © Photo: Messe Düsseldorf, Constanze Tillmann

Last year's IJC featured an all-time high of 63 presentations © Photo: Messe Düsseldorf, Constanze Tillmann

TheIJC offers "best opportunity to meet all the information and contacts of the inkjet world in one spot" – Frank Huppmann, Koenig & Bauer Kammann © Photo: Messe Düsseldorf, Constanze Tillmann

DO YOU HAVE NEWS TO SHARE?

CONTACT: inbrief@specialistprinting.com

Global Graphics appoints new CEO

Mike Rottenborn has taken over as Global Graphics' new CEO following Gary Fry's decision to step down from the post at the end of the year to pursue other avenues in the printing and publishing software industry. Previously the president and CEO of HYBRID Software Inc., Rottenborn took up his new position on 1 January 2020.

Gary Fry had served as Global Graphics' chief executive officer since 2008 and steered the company through a growth period during which it acquired Meteor Inkjet and Xitron LLC.

Rottenborn (52) has spent 30 years working in the graphic arts industry and began his career as an electrical engineer with DuPont Printing & Publishing. After DuPont, Mr Rottenborn joined PCC Artwork Systems to focus on prepress workflow software for packaging and commercial printing customers. He founded Hybrid Software in 2007 to provide a software solution that bridges the gap between e-commerce portals, prepress workflows, and MIS/ERP systems.

Guido Van der Schueren, chairman of Global Graphics commented: "Gary Fry has been instrumental in shaping Global Graphics into the organisation it is today with a very clear strategic focus on digital and inkjet printing and the board is grateful for the energy and dynamism he has brought to the role. In Mike Rottenborn the company has the ideal candidate to succeed Gary due to his impeccable technical credentials combined with extensive commercial experience. He also has the analytical, leadership, and organisational skills that are required to guide the business forward. With decades of industry experience to bring to bear he is a well-known and respected figure and the board is delighted to welcome him as part of the Global Graphics team."

Mike Rottenborn started his new position as CEO of Global Graphics on 1 January

www.globalgraphics.com ■

SGIA opens 2020 Safety Recognition Award Programme

Now in its 35th year, the Specialty Graphic Imaging Association (SGIA)'s annual Safety Recognition Award Program runs from January 1 to December 31, 2020, and encourages SGIA members to integrate health and safety into standard business practices.

SGIA member companies receive 'points' for specific safety activities and initiatives, such as developing a new safety policy, creating a safety training programme for new hires and providing worker safety training. Participants then submit documentation for each activity, and all companies that earn 80 points or more will receive an award and recognition on the SGIA website, with the three top-performing companies receiving additional recognition.

"Safety in our industry is paramount," said Marci Kinter, Vice President, Government Affairs, SGIA. "Studies show that companies that focus on safety and health issues see improved performance in areas, ranging from morale and productivity, to operating and insurance costs. This is a great way for member companies to develop, and see how others develop, comprehensive safety initiatives in the workplace."

www.sgia.org ■

SGIA members are encouraged to integrate health and safety into standard business practices

Xeikon opens Innovation Centre in Shanghai

Designed to support expanding Chinese markets, Xeikon has opened a state-of-the-art innovation centre in Shanghai where visitors and customers will have the ability to test a variety of applications and options. The interactive facility will be equipped to house the latest Xeikon equipment and technologies, and Xeikon staff will be on hand to offer expertise, guidance, and demonstrate creative solutions and applications for a significant variety of markets and sectors.

"We are seeing unprecedented global growth in the desire for digital printing solutions for labels and packaging," stated Klaus Nielsen, General Manager Xeikon Asia. "We are very pleased to be able to open this important Innovation Centre in Shanghai and bring our technology to this region. Xeikon's high technology facility will play an important role in the development of our business in China and will support our Chinese customers in helping them to make considered decisions when investing in Xeikon's digital technologies.

www.xeikon.com ■

Roland President joins ISA Board of Directors

Andrew Oransky, President and CEO of Roland DGA, has been appointed to the International Sign Association (ISA) Board of Directors. As the governing body of ISA, the Board of Directors supervises, controls and directs the affairs of the Association, its committees and publications, determines its policies, actively pursues its objectives, and supervises the disbursement of its funds.

"Andrew's leadership skills and deep understanding of the sign, graphics and visual communications industry have been an asset to Roland DGA, and they will be to ISA as well," said Lori Anderson, ISA president and CEO. "He joins the Board at an exciting time, as our industry continues to innovate and look toward the future. His insight will be invaluable in setting direction for ISA as we help member companies capitalise on the opportunities ahead."

www.rolanddga.com ■

Roland DGA President and CEO, Andrew Oransky

ColDesi launches Daily-Jet 4060

Showcased at the Impressions show in January, ColDesi's new hybrid printer offers the benefits of both digital and screen technologies. The Daily-Jet 4060 is aimed at pre-digital screen printers, high-volume direct-to-garment (DTG) shops and team/sports league printers, and businesses looking to increase profits by lowering operating costs – particularly on orders in the range of 25–300 items.

Features of the Daily-Jet 4060 include: lower operating and per print costs; lower inception costs than industrial sized DTG machines; higher quality blends and bleeds (no half-tones); on-press pre-treating; single set-up for poly, cotton, and blends; reduced wear and tear on the printhead, and faster job set-up and job changes.

"With the Daily-Jet 4060 we have a pricing and performance breakthrough," stated Mark Stephenson, Director of Marketing for ColDesi. "It's tens of thousands of dollars less than comparable systems and that gives the highest ROI and the lowest inception costs.

"Our hybrid lays down the white ink channel in just a few seconds using traditional methods, but you also get the beautiful high-quality prints of DTG," Stephenson concluded.

www.coldesi.com ■

The new Daily-Jet 4060 hybrid digital screen printer from ColDesi

Second Lüscher CTS system installed by Joh. Sprinz

German glass manufacturer Joh. Sprinz GmbH has installed the XXL JetScreen! LT 55/32 CTS system from Lüscher at its premises in Grünkraut. The company processes around 110 tons of raw glass per day to manufacture shower enclosures, glass doors, exterior facades and other glass products.

Joh. Sprinz initially invested in Lüscher's JetScreen computer-to-screen technology for its screen printing stencils in 2000, when the software was still based on inkjet technology using hotmelt. In spring 2019 the company signed a contract for a JetScreen! LT 55/32 with a maximum frame format of 5500 x 3200mm.

Installation of the 7.5-ton system on the first floor of the Grünkraut plant took place in mid December and the new CTS went live three days later.

The investment is expected to yield savings in consumables, believes Hubert Hofer, Production Manager of Screen Printing, as well as improve quality of the screen printing stencils. Compared to the old system, which operated with 635dpi – the technological standard at the time – the new system works with resolutions of up to 2540dpi.

www.luescher.com ■

The Lüscher XXL JetScreen! LT 55/32 CTS installed at Joh. Sprinz in Grünkraut

Seiko and GIS collaborate to expand printhead options

Users of Seiko Instruments' recirculating RC1536 printhead will benefit from increased integration options following a collaboration between the two companies.

The Seiko RC1536 printhead can accept a wide range of viscosities and is compatible with oil-, UV-, solvent- and water-based fluids. Featuring a 108mm print-width, the printhead also achieves up to 10 levels of greyscale with a drop range size between 13–225pl.

GIS's HMB-SII-1536 can drive up to 4 x Seiko RC1536 printheads off each board. The compact HMB is based on GIS's Ethernet platform, which includes data management, waveform control and printhead diagnostics, all accessed via Gigabit Ethernet. It supports the full binary and greyscale capabilities of the Seiko printhead.

The collaboration was sealed with a handshake between Nick Geddes, Managing Director of GIS and Frank Kühn, Managing Director of Seiko Instruments, at GIS' booth at InPrint 2019. "We are glad to have GIS as a global leading partner for a trustworthy and reliable collaboration and look forward to future growth," said Kühn

"GIS is delighted to have collaborated with the team at Seiko to add this new Head Manager Board for the Seiko RC1536 to the company's existing product portfolio," added Geddes. "This now provides a greater opportunity for customers to incorporate GIS technology to suit their application."

www.seiko-instruments.de ■

GIS' Nick Geddes (L) and Seiko's Frank Kühn at InPrint 2019

Esko software update

The release of an 18.1 update of the Esko Software Platform, the suite of software solutions from Esko, is intended to make operational efficiency improvements and offer significant new functionality to users in the label, packaging and wide format sectors.

Upgrades include a patented new trapping concept for ArtPro+, along with expanded support for Action Lists and brand new Dynamic Marks.

ArtiosCAD 18.1 benefits from an enhanced canvas layout, manufacturing tools, latest DWG and Spatial libraries, and new functionality in the innovative ArtiosCAD Preflight module now including automatic fixing.

Automation Engine has a new 'Optimise File' task to simplify user experience, with new tasks exploiting the processing steps in native PDF.

Device Manager in Automation Engine offers an optimised merging algorithm to reduce flexo platemaking waste.

There is also a new online Truck Analysis tool, and customised emails are available for Share & Approve.

Jan de Roeck, Esko Director of Marketing, Industry Relations & Strategy, believes that the updates will drive increased efficiency by enhancing and improving the user experience and offering a greater range of functions for customers.

www.esko.com ■

ESKO SOFTWARE PLATFORM

Esko released the Software Platform 18.1 update late last year

DO YOU HAVE NEWS TO SHARE?
inbrief@specialistprinting.com

Expansion prompts SignTronic relocation

To accommodate the burgeoning sizes and quantity of worldwide projects and to maintain standards of its Swiss CtS Technology, SignTronic sought suitable and bigger premises to cover the needs of all of its internal departments. In December 2019 the company moved from Widnau to a larger site a few kilometres away in Rüthi, also in the Rhine valley. SignTronic is now ready to welcome guests at its new site.

www.signtronic.com ■

SignTronic's new premises in Rüthi, Switzerland

Labelexpo releases dates for 2020

Reflecting on a busy 2019, highlights from last year include: the 40th anniversary edition of Labelexpo Europe 2019 in Brussels – the most successful, international yet, with 38,000 visitors and 693 exhibitors from 140 countries. There was the largest ever edition of Labelexpo Asia in Shanghai, with 18% more visitors, at 23,636, and a floorspace 26% larger than in 2017. Labelexpo South China was re-launched – meaning there will now be a Labelexpo in China every year from 2020 – and there was the launch of Labelexpo Mexico 2021. Brand Print events were launched in the US, India and China for 2020, and Mexico for 2021. These will all be co-located with Labelexpo shows.

At-a-glance dates for 2020:

- Label Summit Latin America: 10–11 March, Santiago, Chile
- Labelexpo Southeast Asia: 7–9 May, Bangkok, Thailand
- Labelexpo Americas/Brand Print Americas: 15–17 September, Chicago, USA
- Labelexpo India/Brand Print India: 29 October to 1 November, Greater Noida, India
- Labelexpo South China/Brand Print China: 1–3 December, Foshan City, China

www.labelexpo.com ■

Inkcups revolutionises cylinder printing

Capable of printing high-quality, full-colour graphics at approximately 600 parts/hour, the Revolution is the new high-speed digital cylinder printer from Inkcups. A significant step up in production volume from the company's successful Helix model, the Revolution is suitable for larger order sizes.

The printer's inline conveyor can be manually loaded by an operator or automatically loaded using a robotic system for a more streamlined process. Parts are automatically loaded onto 12 vacuum mandrels, deionized, pre-treated with corona or plasma, printed and unloaded onto an exit conveyor after cycling through the machine.

The Revolution prints 360-degree seamless graphics with a maximum resolution of 1,200dpi on a wide range of cylindrical objects and open-ended tapered vessels. It can print images up to 220mm tall on a part length of 76–305mm, with a diameter of 63.5–111mm. The system's printhead technology can cover the full length of a part up to 220mm without additional printhead requirements, resulting in better image quality without stitching. Common applications include stadium cups, pint glasses, stainless and plastic tumblers, cosmetic jars, glass and plastic bottles, beer cans and oil filters.

"I feel it is everything we intended to achieve when we started the project over two and a half years ago," declared Ben Adner, Inkcups Founder and CEO. "We set out to develop an industrial printer for the sweet spot in the market – a machine that's fast enough to produce real volume; flexible enough for quick change over; have the outstanding print quality our customers are accustomed to; and priced competitively."

www.inkcups.com ■


Available globally, Inkcups' new Revolution cylinder printer automatically loads and unloads products for increased production capabilities

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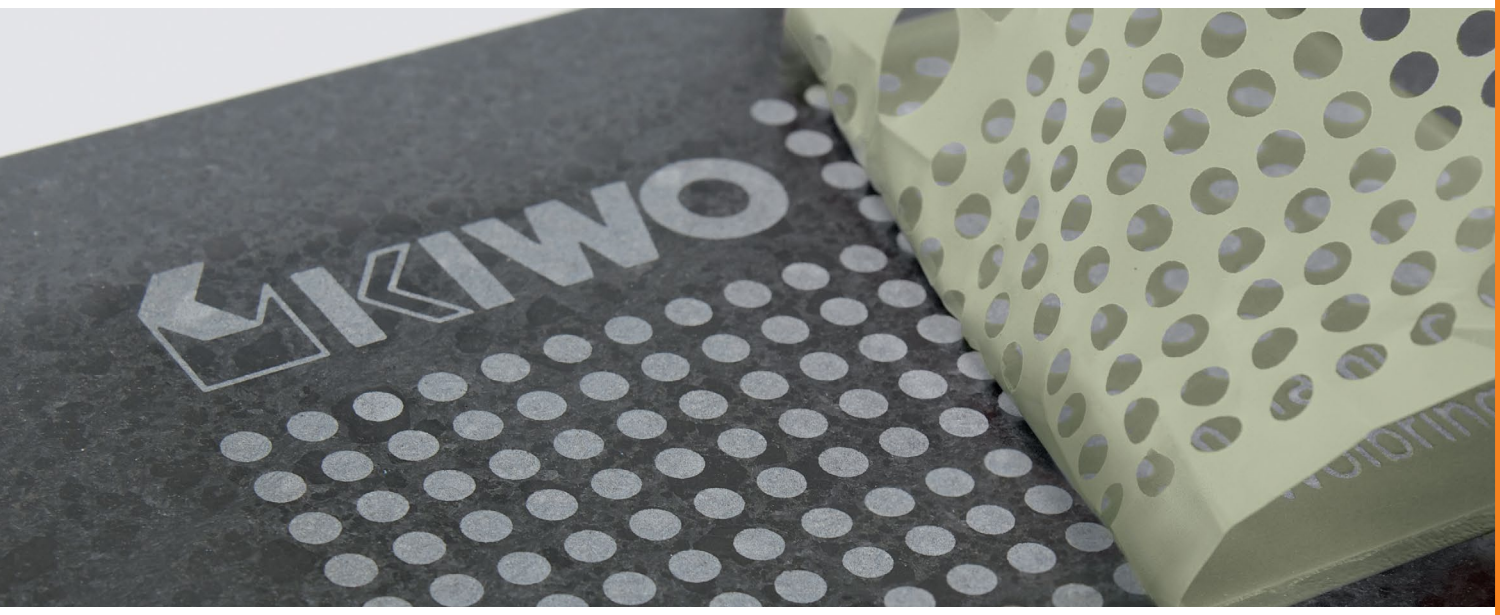

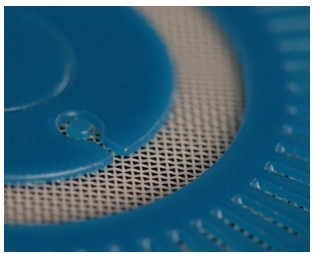

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