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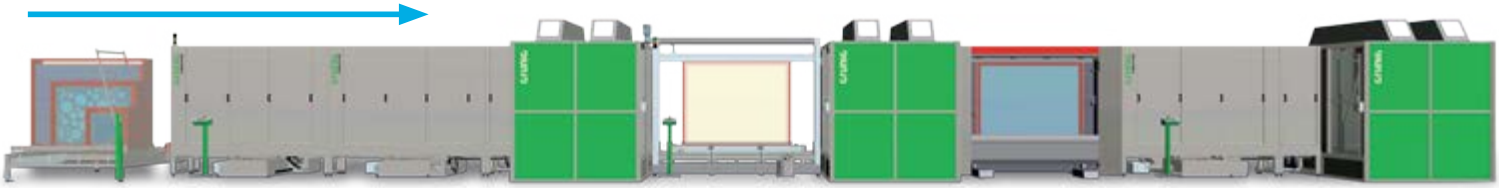

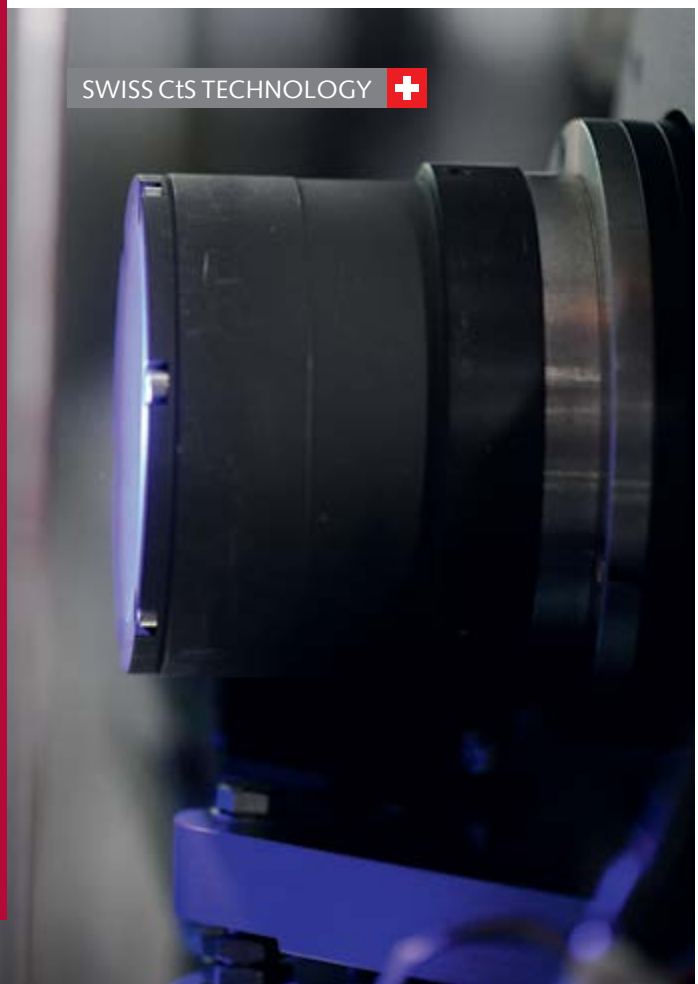

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Welcome • Benvenuti • Bienvenue • 欢迎您 Willkommen • Bienvenido • Добро пожаловать

Dear Reader,
Welcome to Issue 4. We have some excellent technical articles which we hope you enjoy as well as some very exciting news!

We are always looking to improve and expand upon our offering to ensure we consistently add real value to our readership. Over the last year we have been working hard to create a new website which complements the magazine and provides a 'portal' to the worldwide specialist printing industry. Full of useful information and content, it will give readers access to the resources they need. There will also be lots of future developments in 2021 which we will keep you regularly updated on.

We are delighted to announce our new website is now live! Please visit **www.specialistprinting.com** and see everything we have to offer such as:

- Directory of Suppliers – fully searchable to help you find the right product or service to meet your needs
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- Events – a fully searchable listing of future key events

These are extraordinary and difficult times and we really hope our new website and the magazine help in bringing you the information and content you need.

Stay safe and please do enjoy using our new website.

Bryan Collings, Publishing Director

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A PROPER CUPPA

Henri Coeme discusses the production steps, quality considerations and volume expectations when sublimating on drinkware in various forms

Do I sublimate on curved substrates such as drinkware in the same way as on fabric or on other flat non-textile surfaces like metal or wood? What tools should I use for these projects?

Sublimation printing on drinkware and other rounded products requires the same software, printers, ink and paper as printing on flat textile and non-textile products. But once the sublimation transfer has been printed, printing on drinkware takes a decisively different route, requiring different equipment and expertise.

The principles of applying the transfer onto the final surface remain the same: pressure, time and temperature are required for the image to migrate from the carrier paper to the substrate. However, those three variables are delivered by a few very specific tools.

Pressure is provided by first firmly wrapping the transfer around the substrate and taping it down with some heat-resistant tape. By itself, however, this is insufficient to produce a crisp image on the mug surface. Additional pressure is required, which needs to come either from a mug press or from a tool called a mug wrap. Along with this pressure, a timed quantity of heat is delivered by a mug press, a 3D vacuum press, countertop-type batch oven, or a conveyer-type oven.

THE MUG PRESS

The original way to sublimate on a mug is with the help of a mug press. The press consists of a closing/pressure mechanism, wrapping firmly around the substrate. Heat is provided by a heating element which consists of a metal filament sandwiched between two heat-resistant silicone pads.

Example of a slanted-wall wrap

The advantage of this process is that it is simple (requires just this one tool) and is inexpensive for small one-off projects. For runs over a dozen, however, the press becomes quite time-consuming. The three-minute intervals between mugs are too long for the operator to idle, but too short to do anything else significant that may distract away from the project.

Another disadvantage is the lack of versatility. Although there are a few presses in the market that come with a few attachments of different shape, mug presses are typically limited to straight-walled 11oz to 15oz mugs. Swapping between different shape attachments, while hot and when available, is cumbersome at best.

A further downside is the heater band. At 400F [204°C], heater bands are fragile while being squeezed between substrate and metal housing of the press. As a result, heater bands tend to fail frequently – they are not cheap and are seldom easy to replace.

Separating the pressure-action from the heating source is the solution to these shortcomings.

3D VACUUM PRESS

The 3D sublimation vacuum press is an all-in-one machine, combining vacuum pressure and heat to wrap sublimation transfer paper around curved shapes to permanently fuse the decoration onto any curved surface. The press can be used to customise many types of substrates like sublimation blanks, mugs, latte mugs, cell phone covers, curved plates, etc.

Because of its size, the press is not suited to large production volumes. However, for irregular surfaces, a vacuum press is the only solution on the market. Vacuum presses can also do drinkware and mugs, but for the

Continued over

The HIX two-step manual no-tools wrap

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straight-wall or slanted-wall drinkware products, there are more economical and scalable solutions available: enter the mug wrap and the sublimation ovens.

THE MUG WRAP

Mug wraps are simple pressure devices, consisting of a clasping mechanism and a silicone pad that wrap and lock around their substrate, providing a close fit between transfer and substrate. There are a variety of wraps in the market which can be divided up in the following ways:

Tool-less wraps vs tools-required wraps: Some wraps will need tools such as drills with special drill bits to open and close the wrap at each cycle. This costs time and effort and delays the process. When closed correctly, they do provide good pressure. However, overtightening can also easily snap the mug's handle. Some mug wraps do not require tools but are clumsy to open and close, wasting time as well. The best choice for a wrap opens and closes quickly and easily, without additional tools.

"The principles of applying the transfer onto the final surface remain the same: pressure, time and temperature"

Welded wraps vs wraps with removable silicone: Welded wraps are permanently attached (welded) to the steel holding pins or the wrap assembly. This effectively turns the entire wrap into a disposable tool.

Since good quality silicone has an average life-span of about 100–150 cycles, the welded wrap, although cheaper to acquire, may end up being the more expensive investment because they are made to be disposable.

Wrap mechanisms with removable silicone can be detached from the silicone with four simple screws. The clasp assembly itself sustains no wear-and-tear and has therefore a near indefinite life expectancy. Since silicone is the least expensive component to replace, the replacement-silicone option may offset a higher initial investment.

Wraps for straight-walled vs wraps for tapered substrates: Straight-wall wraps cover mugs with parallel walls. Tapered-wall wraps cover slanted walls. Both straight and tapered-wall wraps can have different heights, depending on the height of the substrate. Ideally, the wrap needs to provide about $^{1}/_{4}$ ins to $^{3}/_{8}$ ins of overhang over the edges on both sides of the mug to provide a good and firm fit for the transfer.

Wraps for small, medium and large substrates: Although the majority of drinkware in the market is the standard 11/15oz mug, a growing variety of substrates seem to appear on a regular basis, requiring different sizes of wraps to sublimate. Sizes may vary from the very small shot glass to the tall travel cooler and from narrow pint glasses to wide dog or cat bowls. Each shape and size requires a different mug wrap. Any inconsistency in the slanting angle will result in uneven pressure on parts of the mug's surface. The wrap's height needs to be sufficient to cover and even overlap the printing surface. Some companies will custom-manufacture wraps for any non-standard shape or size upon request.

Variation in silicone quality and durometer: Quality and durometer of the silicone directly relate to flexibility and longevity of the wrap. A good quality silicone can last 100–150 cycles. Keeping the wraps in a dry, cool place, allowing them to cool between cycles and not loosely throwing them in boxes, but instead hanging or laying them to cool, are all tips that will promote silicone longevity.

Durometer (hardness) of the silicone is important as well. Too soft and the wrap will provide insufficient tension. Too hard and the clasp will be difficult to lock and open. A 'Goldilocks' solution provides the best trade-off between tension/pressure on the one hand and user-friendliness/ease of manipulation on the other.

Straight-wall wrap

SUBLIMATION OVEN

Batch-type or conveyer-type ovens can be small enough to accommodate no more than 2–4 mugs or large enough to hold as many as 400 mugs at any given time. A few key features are critical for a quick, complete and even sublimation in an oven. Ideally, the oven is a convection-type model. The forced air inside the oven chamber allows for a quick and even heating of the mugs regardless of their precise location inside the oven, so that all mugs are equally and completely sublimated, top-to-bottom and handle-to-handle. A quality convection oven features strong airflow and sufficient heating capacity to quickly heat up the cooler mugs as they are placed inside the oven.

Convection ovens used in food preparation are generally too small to make the process economically feasible; they are insufficiently powerful to provide the required air velocity or heating speed needed to achieve a quick and even sublimation of all mugs in the oven.

Equal air distribution inside the oven is even more critical in the case of larger conveyer-belt type oven chambers. Without proper regulated air flow, sublimation will be unfinished, and substrates wasted. A proper temperature differential is within +/-5ºF

A non-welded wrap: detachable silicone

across the belt and within 15ºF top to bottom of any substrate. For these types of ovens, accurate belt speed control is also critical, so that all drinkware lingers equally long in the oven chamber. Differences in heat quantity will result in differences in colour outcomes.

For the larger conveyer-belt units, an appropriately sized cooling tower is no small luxury, allowing for mugs to be picked off the belt and packed into boxes at the exit side of the belt. An integrated cooling facility may be superfluous for a smaller countertop oven, in which case a table fan can easily do the job.

"The best choice for a wrap opens and closes quickly and easily, without additional tools"

Since conveyer-belt units can hold many mugs at any given time, the belt will need to be sufficiently strong to support the weight of the drinkware. Do not attempt to place mugs on a standard fibreglass belt of an oven used for screen printing: the belt will be unable to support the weight of the mugs and will rupture. A chain-linked stainless-steel belt with a weight-support capacity of 6lbs[2.7kg]/ft^2 is ideal for drinkware. Support reels are needed to carry the belt without sagging.

Customers have a choice between smaller batch-type countertop ovens and larger conveyer-belt ovens. Typically, a customer that has outgrown their mug press will first look at a smaller batch oven because of its increased capacity and labour-efficiency. For even larger capacity and efficiency, different sizes of conveyer-belt convection ovens are available.

Because of the demand-volatility of drinkware during the year, companies often use a combination of ovens side by side: a countertop oven for off-peak days combined with a conveyer-belt oven for peak season. Larger companies may have several size conveyer units side by side for the same reason. ■

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SCREEN TIME

Mark Evans explains how screen-making can benefit from automation, in the form of CTS combined with a tailored modular inline solution

Automation: 'the use of machines or computers instead of people to do a job, especially in a factory or office' (definition of automation from the *Cambridge Business English Dictionary* © Cambridge University Press).

Traditional screen-printing is an ancient art form… dating back over 1,000 years to China around 950AD. As such, it has always been seen as an artistic endeavour, with the commercialisation of the process being a relatively recent development. In the early 20th century, the invention of photo-sensitive emulsions catapulted screen printing from an artisan-based cottage industry into the mainstream. The arrival of the first manual carousel presses for t-shirt printing in the late 1960s spawned an entire industry and represents an early example of how even a basic level of automation can facilitate rapid change and growth.

LABOUR SAVING

Today a modern day textile screen printing factory bears little resemblance to its forebears, even though the basic principles remain the same. Automation is everywhere – from the computer-based graphics software used to design complex t-shirt artwork to dedicated colour separation and RIP programs that facilitate the process of imaging the stencil on the coated screen. Automatic carousel presses arrived in the late 1980s allowing for complex multi-colour designs to be printed by a single print operator.

In the screen room itself, the physical process of making the screen stencil has lagged behind some of these other automation developments. While the process of imaging a film positive can be considered an automated 'digital' process – controlled by computer, the physical task of placing the film on the screen, exposing it to a UV light source and then washing out the unexposed emulsion (rinsing or developing) is, for most screen shops, a manual, labour-intensive process.

"Technology used in the screen wash systems for screen reclamation can be easily adapted for screen developing"

One innovation is automatic screen coating machines as an aid to coating the screen emulsion on the mesh but although these systems are gaining popularity, they are more about improving quality and consistency than about saving manpower.

COMPUTER-TO-SCREEN

The introduction of computer-to-screen (CTS) systems in the last decade has seen the textile screen room take its first major steps towards automation. CTS systems can take several forms but the most popular use a wax or water-based ink jet print system to print the stencil image directly onto a screen pre-coated with a conventional photo-sensitive emulsion. Exile's Spyder II & new Spyder III systems are good examples of this technology. CTS removes the need for using film positives and provides accurate digital placement of the image on screen, ensuring precise screen-to-screen registration and removing the possibility of human error, and saving labour costs. CTS has also been shown to deliver improved image quality compared to using film – partly because the direct application of the image helps with the UV exposure process as it removes the need for a vacuum and ensures that undercutting, whereby UV light 'creeps' under the stencil, is completely eliminated.

RECLAIMING SCREENS

CTS is now seeing widespread adoption rates. But for most shops the exposure and subsequent screen rinse or wash-out has remained a manual process. In particular, the most labour-intensive process that remains in the majority of screen rooms is the wash-out process to 'develop' the screen stencil. Typically, this involves an individual armed with a pressure washer standing in front of a wash-out booth, rinsing out the un-exposed emulsion by hand.

By contrast, the equally labour-intensive processes that are involved in screen reclamation have seen a number of manufacturers bringing out standalone and inline screen washing and de-coating machines that automatically remove the ink

Continued over

CTS systems such as Exile's Spyder III are helping textile screen rooms to embrace automation

The vertical design of Exile's V-Lux exposure unit allows for easy loading and unloading of screens

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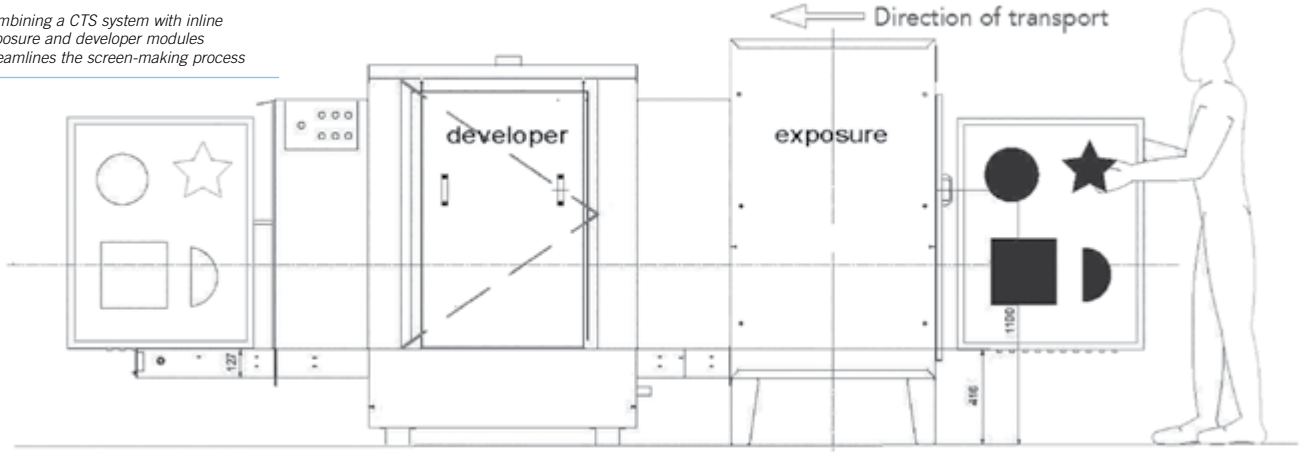

Combining a CTS system with inline exposure and developer modules streamlines the screen-making process

and emulsion from a used screen. First the old ink is washed off the screen and then the old emulsion is removed using high-pressure jets and chemicals. The screen can then be re-used without requiring it to be re-meshed. Previously this process was a very time consuming and labour-intensive activity. An automatic screen reclaim system is a proven labour-saving investment.

These same manufacturers – companies such as Lotus Holland, Inpro, Zentner and Grünig are now turning their attention to the front end of the screen production process: screen making rather than screen reclaiming. The technology used in the screen wash systems for screen reclamation can be easily adapted for screen developing – in fact it is a simpler process, as no chemicals are required. M&R was one of the first companies to address this issue when it started marketing the standalone Eco-Rinse which automatically rinses or 'develops' the exposed screen using high pressure water jets. However, this process still requires an operator to manually load and unload the screens by hand, so its labour-saving credentials are somewhat limited.

INLINE APPROACH

Using the same inline approach as their reclaim systems, some companies are now adding a screen exposure cabinet to the front end of their developer systems to create an inline screen-making solution that can take a CTS-imaged screen stencil and automatically expose and develop using a two-stage modular process. These systems have been designed specifically to work with inkjet CTS systems – the UV exposure module can be designed vertically as it does not require a vacuum when used with computer-to-screen inkjet stencils.

"An inline screen-making solution can take a CTS-imaged screen stencil and automatically expose and develop it using a two-stage modular process"

In 2017 Lotus Holland released its Lumenator II system – an inline exposure and developing system that could process screens at a rate of up to 40–50 screens an hour.

Another European manufacturer, Inpro has adapted its TigerClean screen developer unit so that it can be converted into an inline system in conjunction with Exile's stand-alone V-LUX upright exposure cabinet.

With an inkjet-based CTS system and inline exposure and developer modules, a fully automated screen room workflow can now be achieved for an investment of less than $US 100,000 (£76,944).

AUTOMATED SCREEN-MAKING

The automated screen-making process can work as follows:

The screen room operator images a screen stencil on an inkjet CTS system with a typical imaging time of one minute or less.

The screen is then inserted into the inline system for exposure. Exposure times on an LED based UV exposure system can be from 10 seconds up to about a minute, depending on emulsion type and mesh count.

While waiting for the first screen to expose, the operator can be setting up a second job on the CTS system.

Then the second screen is inserted into the inline system and the first screen is automatically transported via a moving belt into the developer module.

High pressure water jets in the developer rinse the screen – removing both the water-soluble ink from the stencil and the unexposed emulsion underneath. Depending on the jet volume and water pressure, wash-out times as fast as one minute can be achieved.

While waiting for the first screen to finish developing, a third screen can be imaged on the CTS system.

The key point about this process is that each stage of screen production takes one minute or less. The first screen will take maybe three minutes to produce (one minute each to image, expose and develop). But once the assembly line is up and running, each additional screen will be ready 60 seconds later.

"A single screen room operator can feasibly produce 50–60 imaged screens per hour"

By combining a modern day CTS system with inline exposure and developer modules, nearly all the labour-intensive elements of screen-making are removed. The process becomes almost fully automated and a single screen room operator can feasibly produce 50–60 imaged screens per hour. ■

Exile's V-Lux inline exposure and development system

Mark Evans is Managing Director of Exile

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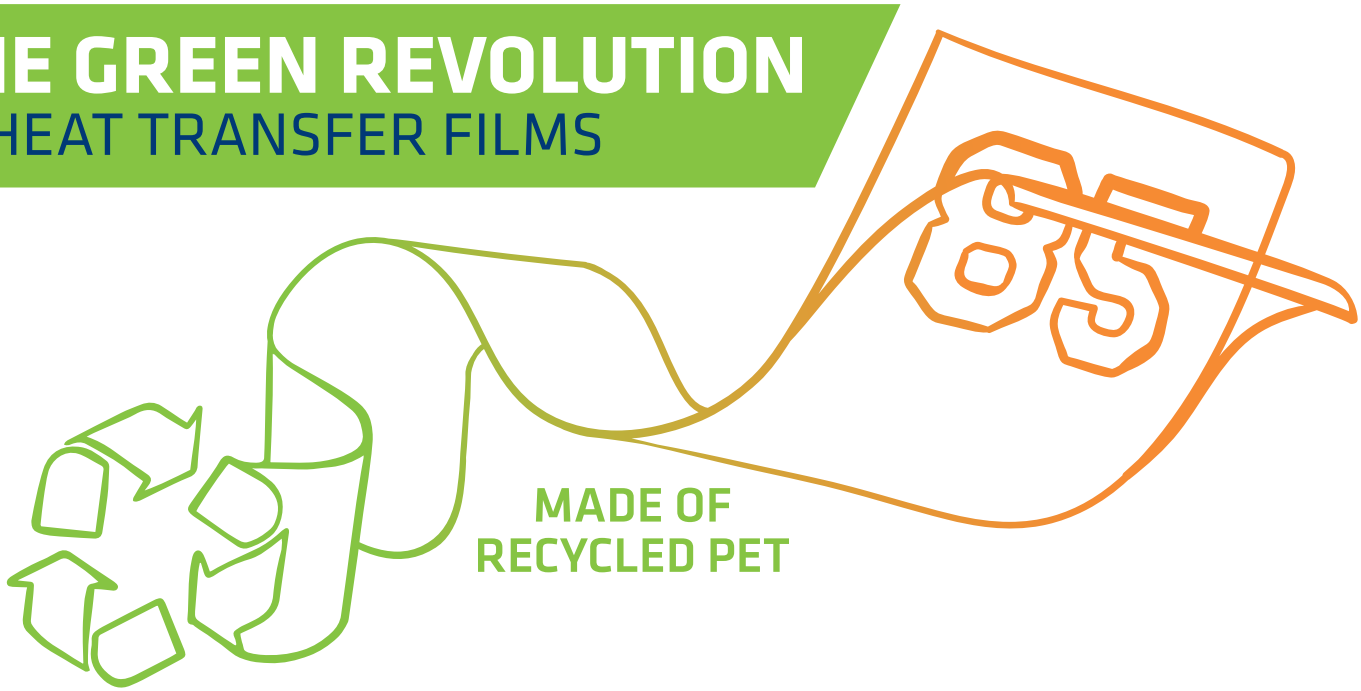

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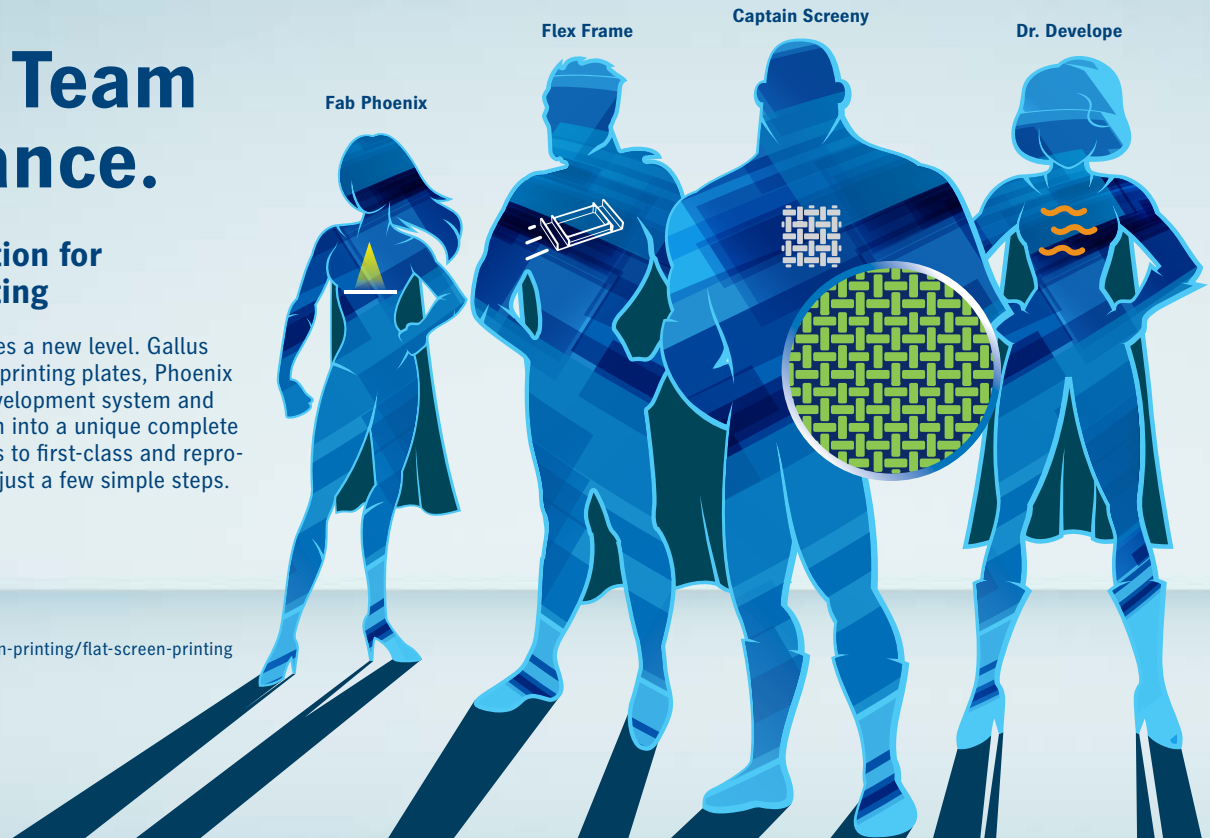

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SIGN UP FOR GREEN

The challenge of making signage greener is getting easier thanks to an increasing array of materials that are better for the environment. Natalie Christ explores some of the options

Nearly 50 years ago, 20 million Americans protested all over the country, calling for businesses and communities to find ways to take better care of the environment and, in turn, protect human health. The protests launched an environmental movement and resulted in Earth Day; an event celebrated every spring since 1970. Since then, many companies have taken steps to help keep our planet healthy.

MONITORING BANNER MATERIALS

With the health of the environment growing each year, more and more companies are beginning to introduce greener banner solutions into the market. But what makes a material 'green'? Many of the signage solutions offered for indoor and outdoor include PVC in their base. In most cases, PVC is attached to the base fabric of the woven polyester (better known as 'scrim'). This helps to reinforce the banner beneath the surface, keeping it strong and stable.

PVC has been known to come with some negative connotations when it comes to the environment, but it can actually be green in many ways. According to ExxonMobil Chemical Company, "PVC requires less energy to manufacture than its largest volume competitors. PVC products are often more sparing of natural resources in their production, service life and end-of-life state than alternative products."

"Environmentally speaking, PVC's durability is, however, also its downfall," writes GreenAndGrowing.org. "This material is neither biodegradable nor degradable, which means that PVC-based products will retain their form for decades… Phthalates are substances added to PVC to increase its flexibility. Studying animals has revealed that some of these chemicals may cause cancer, as well as kidney and reproductive system damage."[1]

The industry has taken a stance on some of these harmful phthalates that are used in banner materials with Proposition 65.

ReSource Backlit S180 is a recycled woven polyester coated fabric that is compatible with UV and Latex printing. The material is fire-resistant and is available in 63–196ins widths

Ultraflex' Ultima EcoVantage banner material is compatible for use with solvent, eco-solvent, UV, Latex and screen printing. Available in 54–196ins widths

California passed Prop 65, or the Safe Drinking Water and Toxic Enforcement Act of 1986, to protect drinking water sources from harmful chemicals. At least once a year, the Office of Environmental Health Hazard Assessment (EHHA) publishes a list of chemicals known to cause birth defects, cancer, and other health issues. Businesses that sell goods in California must comply with Prop 65; for example, posting a warning if a product contains certain levels of a harmful chemical on the list.

GOING GREENER

If you are looking to go greener, there are various types of signage solutions out there. In recent years companies have branched out and created more materials that are better for the environment. Taking into account the products

Going green helps customers to be conscious about the side effects of harmful chemicals while protecting themselves and the environment

base, chemical composition and various tests that comply with environmental safety, the textile industry offers sustainable solutions.

Materials that are PVC-free and phthalate-free are great offerings for customers looking for an environmentally conscious solution. These types of materials are designed for outdoor advertising, wall coverings, banners and other displays. Although they do not have the typical construction of a regular PVC banner, these products offer a high quality, durable and lightweight solutions.

Ethylene vinyl acetate, also known as EVA, is another type of material composition that can be used to make products greener. Although it may sound a bit unnerving, EVA products can be incinerated to produce energy. When incinerated, EVA produces energy at a rate of 10kWh/Kg. This is comparable to the energy generated by natural gas.

"Many signage solutions offered for indoor and outdoor include PVC in their base"

Banner grade PVC, by comparison, produces energy at a rate of 1.5–4kWh/Kg. This is comparable to the energy produced by burning waste wood products at the lower end or at the upper end brown coal. To be fair, we also have to factor in that both material types are composites and contain polyester. Polyester incineration produces 4–7kWh/kg of energy. Products made with EVA are flexible and do not require the use of plasticisers, making this material phthalate-free.

If your customer is looking to go even greener, they should source products that are PVC-free and recyclable under code nr. 1 (PET). PET or PETE is a clear, tough plastic commonly used as single use bottled beverage containers. This type of plastic is easily recycled, inexpensive, lightweight and poses a low risk of leaching breakdown by-products into the environment. PET and PETE are in high demand for remanufacturers, but recycling rates are only around 20%. This can also be used as a fibre and can be collected through most kerbside recycling programmes.

PROTECT AND PROVIDE

Ultraflex has developed multiple solutions to help customers go green with its EcoVantage product line that alleviates the need for PVC and phthalates and better assists with recycling materials. Ultima EcoVantage is a phthalate-free material made from EVA-coated polyester and as such is free of Isocyanates and brominated compounds. Ethylene vinyl acetate is used in a variety of food and medical fields and is flexible enough to not require the use of plasticisers. Ultima EcoVantage has a high energy release fuel at end of life, which can be disposed of via waste to energy incineration. EcoVantage 190 is a 100% PVC- and 100% phthalate-free material that recycles under code nr. 1 (PET), allowing it to be collected through most kerbside recycling programmes.

Ultraflex has also developed the ReSource line, which repurposes polyester yarns for new products and uses. ReSource Eclipse D260 and ReSource Backlit S180 are both made from recycled yarns, are crease resistant and bright white woven polyester materials. ReSource Eclipse D260 is produced with GRS-certified yarns. GRS is an international, voluntary, full product standard that sets requirements for third-party certification of recycled content, chain of custody, social and environmental practices and chemical restrictions. ■

Natalie Christ is Marketing Coordinator at Ultraflex

*Footnote: [1]Green and Growing: https://www.greenandgrowing.org/polyvinyl-chloride-eco-*impact/

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TAKING STOCK

In the midst of a pandemic, now is the time to focus on production processes. Kieth Stevens delves into some of the best ways to safeguard and future-proof your business

During the recent 'stay at home' mandate due to the Covid-19 pandemic, I had a chance to do many repairs at my house. Things that had been left un-done for far too long: the leaky faucet, the clogged rain gutter, cleaning the fish pond, endless yard work… on and on. Then I started to think, what if I sell this house and move? Would the new occupant know about all the quirks that come with maintaining this particular house? Such as the sticky window that needs to be lubricated every summer due to the heat… etc. I wouldn't have to do these chores any longer, but undoubtedly, I would inherit someone else's headaches at the new house.

Now imagine your screen print company or any other type of company. Imagine all the little daily details it takes to keep things running efficiently and smoothly. The air compressor filters and fluids, light bulbs (type and sizes), drains, sticky roll up doors – who remembers all that stuff? How about the way certain customers like their garments printed, or which ink works best for a pesky team shirt material?

Enter the Covid-19 pandemic: your shop is forced to downsize, people are let go or sent to work from home – what are you going to do? What if the compressor is acting up again and the person you have been counting on to maintain that is out? Who will you call?

Invest in better quality equipment. Example printed with loose mesh (left). Edges are much more crisp and defined when printed with tight mesh (right)

DOCUMENT PROCESSES

A number of years ago, International Coatings went through an ISO (International Organisation for Standardisation) certification process. One of the things about going through the ISO certification is to force a company to look hard at its processes, the way it does things. After successfully operating for over 50 years at the time, there were definite hurdles to getting everyone on the same page. Some have worked at the company for more than 40 years, and they do things "because that's the way we've always done it." Our consultant called it 'Tribal Knowledge.' He posed the important 'what if' questions that each shop should consider: What if a staff member is no longer there? Will others know how to take over their function?

There is no time like the present to take a few moment each week or month to try to get all the procedures documented and capture that tribal knowledge. Meet with each head of department and try to capture all the things that they do and know (you can't fix what you don't know). When meeting with your key employees, ask what other tasks they do that may not be written down or part of their job description, but that they may do instinctively (they may not think twice about doing this task, but it could be very important or taken for granted).

Pantone Colour ink matches, labelled with formulas printed from International Coatings' online PMS formulation site

PROCUREMENT

I have worked at some companies that had employees who had been there for decades, and they do things that no one really thinks about until they go on a well-deserved vacation. All of a sudden, a sinking feeling or panic may pass over you: who unlocks and locks the door on time every day? Where do we purchase those shirts that a particular customer likes? What underbase ink was used on that bleeding performance shirt that the customer just re-ordered?

If you haven't done so already, create a list of preferred vendors and be sure to find secondary vendors for fast-moving merchandise. That way, you won't be left in the lurch if one vendor does not have a particular garment in stock that your customer absolutely needs… tomorrow! Take a look at your buying habits and see if there are ways to purchase more effectively. Buy

the items you need most in bulk, and resist bulk-buying items that are rarely used.

Don't forget to reach out to your supply vendors for new and/or better products. Sometimes we can get caught settling into a groove and are content but trust me, it's worth exploring newer or better options if they make your production function better and with less waste.

CROSS-TRAIN PERSONNEL

Cross-train personnel so each can perform multiple tasks as backup in case one is out sick or no longer with the company. Cross-training builds the skills of everyone in the company, which is a win-win for you and your employees. Employees can share their knowledge and ideas to improve processes, which can increase motivation and increase employee retention. It may also help curb less desirable employee behaviours such as disrespect and superiority over others. If an employee is reluctant to assist in cross training others, it may be an indication that they do not have the company's best interests at heart.

STREAMLINE PRODUCTION

While you're looking around to find ways to document important tasks and cross-train personnel, take a look at how you can also improve your production efficiency. You know how you have that table or corner in your house where odds and ends accumulate and you don't really notice it anymore – the catch-all table? But when you visit someone else's house, you immediately notice the place where they leave their stuff. Sometimes it's as simple as re-locating that table or equipment or even moving a chair or other obstacle that's in the way, in order for the printing process to flow better.

How many steps does it take to place a printed shirt onto the dryer, for example? If

Continued over

Quality artwork is especially important when reproducing photographs. In this close-up, the fine hair strands are even visible on the finished print

you have several printing machines but only one dryer, is that dryer centrally located and easily accessible to all the machines? Do you need to invest in an additional dryer in order to churn out production at a faster rate?

SCREEN DEPARTMENT

The two most overlooked departments at shops I've visited are the screen and ink departments. Screen and ink quality are not just important, they are the cornerstones of a print shop! Having the tight meshes on screens, using the correct mesh count and emulsion thickness (emulsion over mesh – EOM) and printing with the right ink for your substrate can streamline your production process and save you a lot of time and money.

"Invest in better quality equipment, emulsion, ink – even better quality personnel"

Running a business is all about the bottom line, and screen and ink quality are minor investments that can lead to big returns.

When I visit shops, I often check their screens for emulsion thickness and screen tension, and I often find shops where their screens exhibit many pinholes. Pinholes are created during screen development and are often caused by some form of debris. The debris can be on the screens before coating, deposited on the coated screens, on the exposure unit glass, or even on the film itself. Minimising contact with debris is key to minimising pin holes.

For example, are you guilty of leaving screens out in the open to dry after reclaiming? I've visited shops where screens were being dried in the parking lot off a busy street. It may be a good time to take a look at purchasing a drying cabinet instead of leaving the screens out in the open, collecting dust. A drying cabinet will not only dry the screens very quickly, it will also keep them much cleaner.

Check your exposure glass, both on top where you place the screen or underneath on the exposure lamp side. You may find an accumulation of coating or a haze on the exposure lamp side of the glass. This haze, if left to build up, may alter your exposure time and cause under-exposed emulsion. Along with the haze, there might be larger dust particles that can also cause pinholes. Make sure you have a spare exposure lamp handy at all times; most of the time you will not be able to find them at the local hardware store and will lose a day or even more trying to find them. Extremely costly!

Obviously, you should make sure your films are kept clean; however – and we're also guilty of this on occasion – some shops leave films out on a table for a few days or more and we all know that textile screen printing shops accumulate a lot of debris. Printing hundreds or even tens of thousands of shirts per day creates a ton of lint and/or fibres that are simply not ideal for a photographic process like exposing screens.

INK ROOM

Apply that same focus to your ink room and take a hard look. The ink department is a vital, yet sometimes underappreciated portion of the textile screen printing world. I seldom find a really well-run ink room unless it's a really large shop that can afford cleaning crews. And because they are so large, they simply can't afford to waste precious time on press. Keeping the ink room clean will avoid down time and production hick-ups.

One ink room issue that may affect your production is dirty ink in the screen, due to inks being stored without a bucket cover, thus collecting dust and lint. Ink buckets that have ink running down the sides should be wiped clean immediately lest it contaminates a printed garment. Someone could touch the bucket and accidentally transfer the ink, or if the bucket was placed on a table that shirts are later placed on, it may inadvertently soil some shirts. Make sure all the ink containers are covered and that there is nothing inside of them other than clean ink. Don't leave a wooden paint stick or anything else that can absorb the oils out of the clean ink.

The detail in this print was challenging, including the high density special effects ink added (yellow ink). Artwork reproduced by permission of David Edward Byrd

Ink that has been used on a long production run and/or has been exposed to excessive heat (possibly from flashing) should never be returned back into its original container to be reused. Typically, the ink is very thick and may look like cottage cheese. It has done its job and needs to be 'retired.' Make sure that the ink containers leaving the ink department are clean going out and are returned to the ink department clean, out of respect for everyone.

If at all possible, limit the customer's colour choices to a stock colour pallet or at least to standard Pantone colours. Dissuade them from tweaking and creating a custom colour, since you will probably mix too much of it and end up with part of your profits locked up in a container on the shelf, hoping for the customer to return some day. Keep a log of inks mixed, what job the inks were used for and what the formulas are. This will enhance your job repeatability and accuracy. If your ink room employee doesn't log all the information, you are creating a huge weak link in your company's future. God forbid that your main ink person goes on vacation or is unreachable – what will you do? Everything should be documented. Most ink manufacturers, including International Coatings, can provide you with some type of software that will help you keep track of all your standard or custom formulas.

Take it from me: 'Ink Doesn't Think.' It will do or look pretty much exactly what you tell it to do. You can make it any colour in the rainbow and make it appear shiny, matte, puffy or flat, soft or hard. The beauty is that the ink is usually the most consistent part of

Most ink manufacturers, including International Coatings, can provide software to keep track of standard and custom formulas

the equation but is blamed for 90% of the problems. There are almost countless other variables that can affect the end product, other than the ink. This is not to the say the ink choice can't be a factor, but many companies simply may not have a full grasp of all the other variables.

QUALITY CONTROL

At the end of each dryer, once your printed shirts are cured, consider keeping a log of not only how many shirts and the various sizes that were printed, but of all the misprints as well and what the cause was. Over time, you should notice a pattern of 1) what your most popular sizes are and in which proportion your customers order them – helpful when ordering shirt supplies, and 2) why those misprints were created, so that you can properly address the problem and correct it going forward.

Whatever you do, do not neglect your quality. Test, test and test! Don't forget to wash-test your prints – preferably before running a full production run – to make sure that your shirts are fully cured. Read or learn about new techniques or tricks that will help you become more efficient in your manufacturing.

ARTWORK

Artwork is a hugely important part of the printing process. The printed shirt is the last and final step of the many steps it took to get the ink on the shirt, but it all started with the art. The artwork goes through some form of colour separation, then to film, then on to screen exposure and development etc. All the steps involve some small loss in quality, so it's imperative that you start off with the best original artwork possible. Have the customer approve the art before you output the film; have someone – or better yet, two people – approve the films before they are burned. Double-check for spelling or other grammatical errors and whether the trademark or copyright logo is showing up in the correct area. If all these prior steps are done well, the application of the inks should be the fun part. But if they are not, it becomes the most frustrating part, not to mention the most costly. Don't skimp on the important stuff; too many times I have found that when trying to save money, shops can go too far and their choices will cost them more in the end.

"I seldom find a really well-run ink room unless it's a really large shop that can afford cleaning crews"

THE BOTTOM LINE

Let's face it, we not only print for fun, but for profit. If we aren't making a profit, it's not much fun. Anything your shop can do to ship more billable product out the door is a wise decision, even if it may cost a few dollars more for the investment on the front end. Invest in better quality equipment, better quality emulsion, better quality ink, even better quality personnel. Anything that will keep the press producing more products with the least amount of downtime (i.e. less pinholes, thicker emulsion, tighter screens), should be considered. Think of your production line as analogous to getting the most miles per gallon for your car. Everyone wants to know what the mpg is and how to improve it (such as through properly inflated tyres, a tune up, oil changes, tyre rotation, etc). No brainer, right? ■

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TO DYE FOR

With constantly-changing technology, it is important to stay up to date to achieve the best results from dye sublimation transfer paper printing. Paola Tiso shares some insights

In order to obtain great printing and transferring results, several parameters need to be considered, all of which can influence the quality of the final results:

COLOUR MANAGEMENT

- The transfer paper
- The printer and all its elements
- Environmental conditions that impact papers' behaviour
- The specific substrate onto which the print will be transferred
- Transferring conditions
- Calibration of the monitor
- RIP for creating the ICC profile.

An ICC (International Colour Consortium) profile permits the user to obtain a high-quality colour combination, with the correct ink consumption to optimise the transfer paper's properties and produce the best result.

A specific printing profile must be created. Firstly, based on the final application, the right transfer paper must be chosen, then a precise ICC profile (generated by RIP software) is required.

PAPER CHARACTERISTICS

Each transfer paper is different due to its composition, structure, coating and grammage, so each paper absorbs, dries and releases the ink in its own specific way. The composition, the thickness and the type of structure of the substrate will influence the results. An accurate selection of both paper and substrate is crucial.

A coated transfer paper with higher ink load capacity is required for intense, bright colours

"Transjet dye sublimation papers are suitable for four main applications: fashion, sportswear, hard substrates and home textiles"

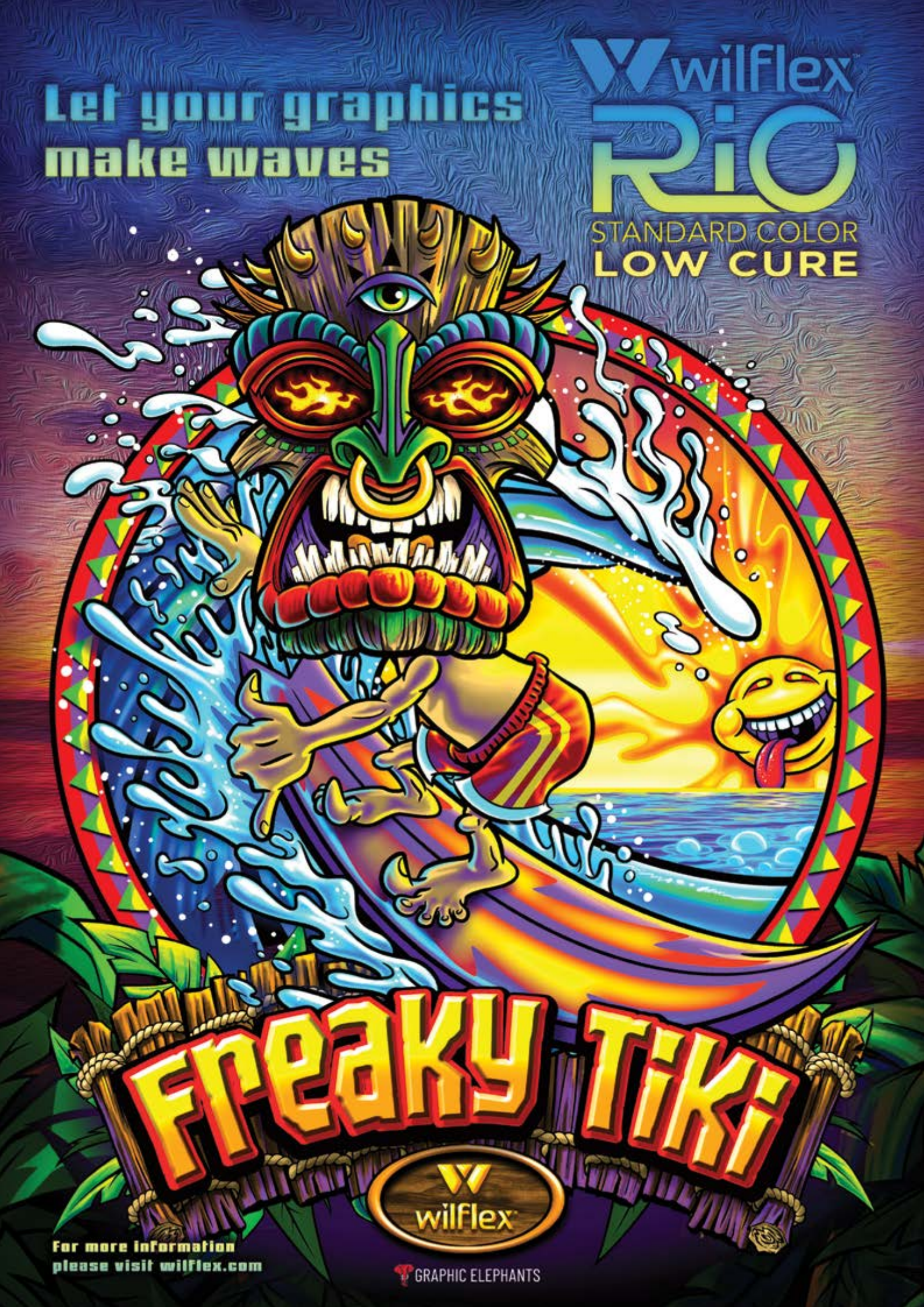
Ink absorption is a particularly important characteristic of the transfer paper as it determines both printing and transferring processes. The absorption of the ink depends on the transfer paper's drying capacity, the amount of ink used, the type of printer (e.g. its printheads, drying capacity and speed) and, last but not least, the environmental conditions as humidity and temperature can have a significant influence on the drying capacity of the paper.

The faster the ink dries, the quicker the printing process can be. The print must be completely dry before winding on the previous layers of papers of the roll, otherwise a set-off issue may occur and the quality of the prints will be negatively impacted. Once the print is perfectly dry, the transferring process can commence. If the printed paper remains stocked in optimal environmental conditions (about 23°C, 50% relative humidity), it maintains its properties and may guarantee excellent transferring results even after several weeks.

The final grammage and type of coating of the paper must also be considered. Dye sublimation papers can be found at about 20g/m² for uncoated papers and can reach, in the Sappi Transjet coated dye sublimation paper range, a maximum grammage of 130g/m². Depending on the final application and the kind of substrate to which the image

Continued over

Sportswear colours must be visible even when stretched, necessitating a transfer paper with strong adhesion properties to allow optimal ink penetration into the fibres of elastic textiles


Let your graphics
make waves
wilflex
RiO
STANDARD COLOR
LOW CURE
Freaky Tiki
wilflex
For more information
please visit wilflex.com
GRAPHIC ELEPHANTS

will be transferred, the specific paper and grammage needs to be carefully chosen. For example, for transferring onto hard substrates, a higher grammage may be preferred to obtain the best results. The combination of grammage and coating of the papers affects not only the ink load and drying capacity but also the speed of the printing process.

PRINTING

Water-based inks are used for dye sublimation. Depending on the kind of transfer paper, select either industrial inks used in printers with Kyocera printheads, or inks containing a lower amount of glycol for smaller, so-called 'plotter printers'.

The printing process needs to be set up well across all parameters:

- Printing profile
- Number of the passes and modality of printing (one or bi-directional)
- Speed
- Drying section
- Amount of ink
- Environmental conditions
- Specific characteristics of the paper: e.g. its affinity with the inks used, its ink load capacity and its drying ability.

The sublimation process is only suitable for home textiles that have a polyester content of 60% or greater

"Pressure must be sufficient to enable excellent contact between paper and substrate, otherwise colours may appear faded"

The sublimation process is suitable for final applications using substrates that are composed of 60% or more polyester. Natural fibres (e.g. cotton) don't allow the dye sublimation inks to be captured and the colours appear faded.

Transjet dye sublimation papers are suitable for four main applications: fashion, sportswear, hard substrates and home textiles. Each application requires a transfer paper with corresponding properties. For example, sportswear requires a coated paper with higher ink load capacity as the colours are usually very intense. Moreover, the colours must also be visible when stretched, due to the elastic textiles used in sportswear. This specific printing process requires a coated paper with excellent adhesion properties, allowing optimal ink penetration into the fibres and, at the same time, avoiding any ghosting effects of the print. It is possible to obtain as many colours as the colour gamut range of the design software allows.

TRANSFER/SUBLIMATION PROCESS

Temperature is the key word for an effective sublimation process. The usual temperature is around the 200–210°C, depending on the type of substrate but can decrease to 180°C for aluminium substrates. The best conditions for printing on dye sublimation papers are around 23°C and 50% relative humidity as the paper reaches and maintains its optimal performance. The transferring time is related to the grammage of the paper and can range from 25–45 seconds, depending on the substrate to which the image is transferred but can even reach three minutes for aluminium substrates.

Pressure is another key concern for sublimation. It must be sufficient to enable excellent contact between paper and substrate, otherwise colours may appear faded. The optimum pressure is around 3-bar.

You should also select the appropriate transfer/sublimation process. The difference between press and calender is primarily a matter of size and depends on the type of application. In some applications, like fashion, transferring by calender 'roll to roll' facilitates a fast industrial process that can run high-speed productions and generate impressive quantities. In other applications, a flatbed press can be sufficient for the transfer of single pieces in a different kind of process. ■

"Each paper dries and releases the ink in its own specific way"

For transferring onto hard substrates, selecting a higher grammage may produce better results

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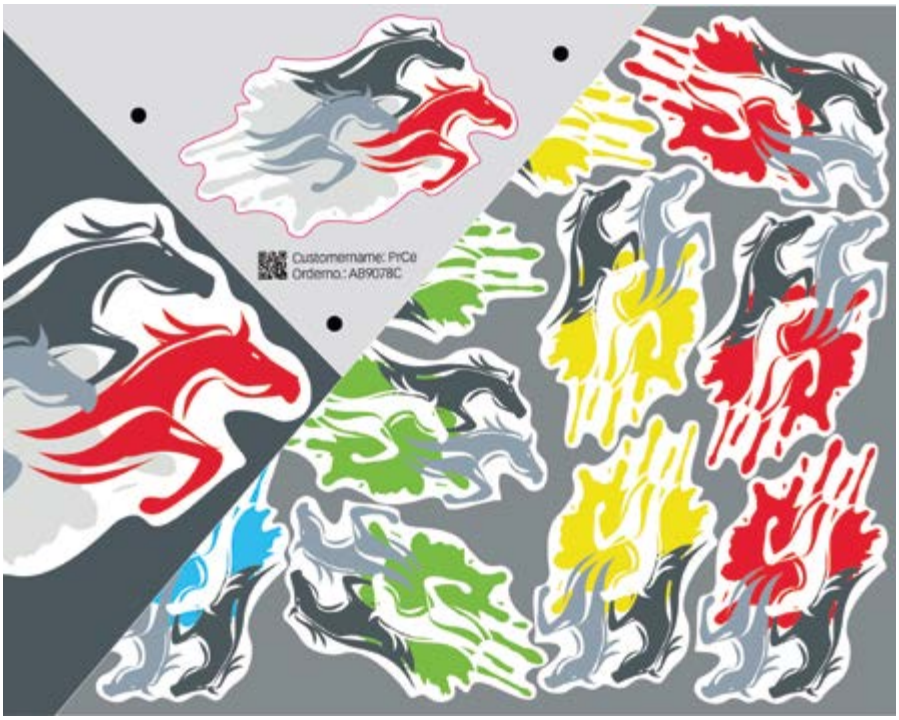
CONTROL CENTRE

Daniel Bischof explores how a new software solution simplifies file preparation and output and enables users to configure their workflows with an appropriate level of automation

Lars Bendixen is Zünd's Segment Manager for Advertising Technology

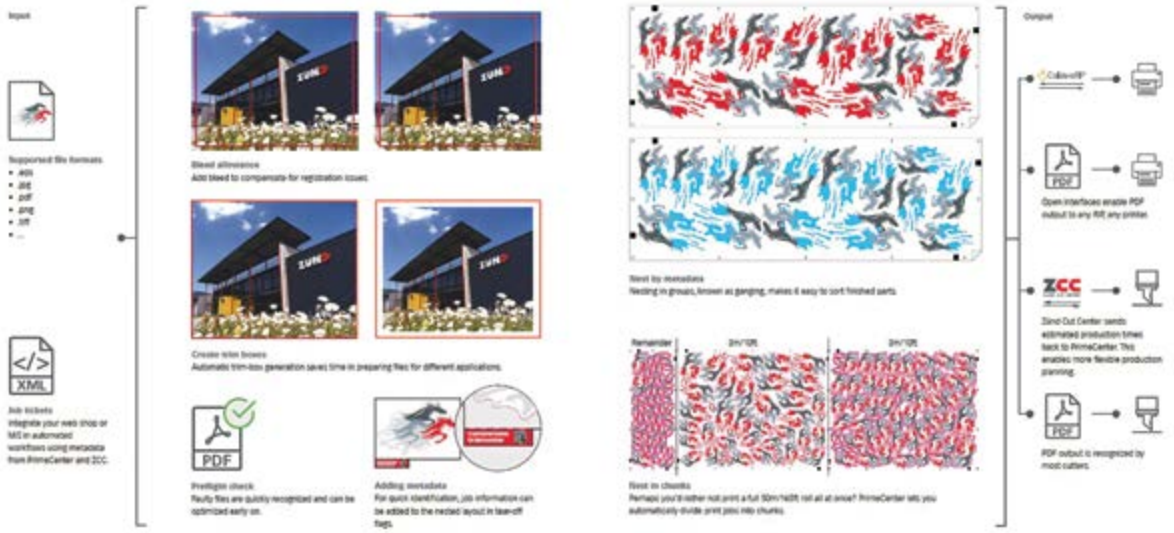


PrimeCenter provides the necessary metadata at the end of the production line

Automation is a growing trend in printing and advertising technology. Digital printing, in particular, demands automation. The challenge is to integrate downstream processing and finishing steps. Otherwise, a lot of things can go up in smoke.

Cutting systems manufacturer Zünd Systemtechnik is convinced that automation brings advantages when it is done correctly, i.e. intelligently. "To automate intelligently means to think carefully about which processes are worth automating and which are not," says Lars Bendixen, segment manager for advertising technology at Zünd. "This is weighing up the pros and cons, because not every effort for automation is in the right proportion to the profit. Intelligence also means that automation does not necessarily have to be expensive. Often even small steps have a big impact on efficiency. A specific example of this is nesting," Bendixen concludes.

No matter whether you are dealing with a single item, small, partial or large series, if you have productivity and profitability in mind, nesting processes can help you achieve optimum utilisation with several jobs on one sheet or plate (paper, cardboard, plastic or wood) or on films and textiles from a roll. It is usually complicated when the cut parts have to be assigned to the respective order again after cutting. To solve this problem, Zünd has developed PrimeCenter pre-press software together with French software company Caldera.



An overview of the PrimeCenter workflow

DISCONNECT AND RECONNECT

PrimeCenter serves as the control centre for the creation of print and cut data. The software simplifies data preparation and output and enables users to automate their data workflow between design, print and cutting individually and according to their needs. Bendixen explains: "Based on the available PDF print data, PrimeCenter

"This is revolutionary for customers with large-format printing applications"

sorts the various jobs on a sheet or roll material – depending on the desired characteristics of maximum material utilisation, delivery deadline or other. This nested print image can be fed into the production process. PrimeCenter then passes on the metadata associated with each order throughout all production steps. At the end of the production line, after cutting, a robot gripper arm in the fully automated version can then remove the individual parts and assign them to the respective orders. PrimeCenter provides the necessary metadata at the end of the production line."

METADATA AVAILABILITY

"This is revolutionary for our customers with large-format printing applications," believes Bendixen. "Everyone who produces digitally has to sort different jobs on one sheet again and again. In production, however, the metadata is usually lost. This means information like the order number, customer name, number of parts per set, quantity of sets, right or left parts, etc. – all this information is not stored in the print PDF and is therefore not passed on in the course of further processing. PrimeCenter is the first software to do so."

"PrimeCenter offers users maximum freedom to automate their pre-press workflow in the way that makes sense for them"

According to Bendixen, PrimeCenter is compatible with any RIP software.

A great deal of manual work is still being done, however, especially in the advertising technology segment. The need for manual work or automation can also vary greatly depending on the season. Zünd and Caldera have taken this into account in the development of PrimeCenter. Therefore, Bendixen says, users are offered as much flexibility as possible: "Regardless of whether the user makes the settings manually or wants to automate them completely, PrimeCenter offers users the maximum freedom to automate their pre-press workflow in the way that makes sense for them."

With full automation, the metadata is exported from an MIS, an ERP or a web shop via hot folders, customised file names or with XML-based job tickets. With different program versions: Basic, Pro and Max, the degree of automation can be adjusted at any time "The unique thing about PrimeCenter," says Bendixen, convinced, "is that the individual parts can be reassigned to the orders after cutting or sorted according to other characteristics, such as individual dispatch or collective delivery. No matter whether it is a single item, a small order, a partial or large print run. It's never been seen before in the large format segment." ■

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BEHIND THE BADGE

With more customers asking about print sustainability, it is important to get up to speed on eco certifications, the most common labels and what they mean, believes Colin Easton

Buying a product with a sustainability certification can be great for your business. As well as reducing your environmental impact, and potentially your costs, you can pass that assurance on to your customers. Increasingly, people are looking for ways to be more sustainable, so may choose you over a competitor if you can prove your service ticks more eco boxes. Additionally, some certifications can pave the way to new markets – a badge for clean air quality could help you access the healthcare and education sectors, for example. Each of the main certifications cover different aspects, so it's important to know what they mean.

Buying a product with a sustainability certification reduces your environmental impact, and potentially your costs

ECOLOGO

A **UL Ecologo** certification indicates that a product has been rigorously tested to comply with environmental performance standards throughout its life cycle. The criteria for this voluntary certificate cover a range of categories, including health and environment, and product performance and use. You may see the green and white UL Ecologo badge on inks, such as the most recent generation of HP's water-based Latex inks.

GREENGUARD

Greenguard relates to air emissions. The certification body, UL, notes that most people's chemical exposure occurs through the air we breathe at home, at work and in education, via the volatile organic compounds (VOCs) found in building materials, cleaning products, toiletries and furnishings – such as wallpapers and furnishings. VOC levels in the inks used for these products have significantly decreased in recent years, and inks that sport the **Greenguard Gold** badge have the lowest in the industry. Latex and Stitch inks from HP have this certification at the highest level, meaning they are safe for decorating an entire room (some printing inks may only be certified for a limited size, such as a single wall or decal).

HP recycling

OEKO-TEX

Oeko-Tex is a network of independent research and test institutes. For its **EcoPassport** label, textile products are tested to ensure they have been manufactured sustainably and do not contain substances that are harmful to humans – the criteria are updated annually. Importantly, these results are published online so anyone can input the EcoPassport label number of a product and be assured their purchase meets their demands. The water-based inks for HP Stitch textile printers hold the Oeko-Tex EcoPassport certification.

ZDHC

The Zero Discharge of Hazardous Chemicals Foundation (ZDHC) has compiled a list of substances that are banned from intentional use during the production of textile, leather and synthetic products, in order to improve air, water and production itself in these sectors. This directory: the Manufacturing Restricted Substances List (ZDHC MRSL) includes over 100 entries, from VOCs and problematic dyes to heavy metals and phthalates. HP Latex inks conform to or meet the standards of the ZDHC MRSL version 1.1, demonstrating an effort to reduce the environmental impact of textile production. **ZDHC's Roadmap to Zero** programme is a multi-stakeholder organisation, which sees major brands, value chain affiliates and associates working collaboratively to improve chemical management practices.

ENERGY STAR

Energy Star is a symbol denoting energy efficiency. It is a government-backed American programme – recognised by 90% of US households, according to its research – but its blue logo is also known by consumers across the world. It independently tests all kinds of commercial and domestic technology, from air

"Manufacturers are constantly improving the performance, energy efficiency, safety and sustainability of their technology and consumables"

conditioners to washing machines to select HP Latex and HP Stitch printers, for their ability to deliver energy savings without reducing performance. This may mean cost savings for print businesses that could be passed on to your customers.

EPEAT

EPEAT (the Electronic Product Environmental Assessment Tool) covers printers, plus products like computers and TVs, and assesses their environmental performance across several life cycle criteria to award them Gold, Silver or Bronze certifications. Manufacturers must sign a contract self-declaring which of the programme's criteria their products meet. The information is accessible via an online registry, allowing customers or resellers to compare printing solutions based on their environmental credentials. The HP Stitch S400 and S500 have achieved the EPEAT Silver grade, while HP Latex low-volume systems have achieved Bronze.

Manufacturers are constantly improving the performance, energy efficiency, safety and sustainability of their technology and consumables. Brands will happily share information with their customers and work with you to find a solution that meets all your ecological requirements. ■

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THE RIGHT CHEMISTRY

Jan Baden explains how a new digital process could address the need for a more sustainable and ecologically sound approach to the chemical treatment of textiles

Jan Baden, CEO and founder of druckprozess

Digital printing machine for textile treatment. The DigiTEXpro project will last until the third quarter of 2021

For a couple of years now, digital printing such as inkjet printing has been a fast-growing technology for coloration in the textiles industry. Only about 30% of textiles are printed and from this third only a small percentage is printed digitally today. On the other hand, about 90% of textiles produced are chemically treated to achieve their functionality and final characteristics.

Nowadays, textile functionalities and characteristics are highly diverse, ranging from, for example: flame retardant, antiviral and hydrophobic properties, to textiles that decompose pollutants, repel mosquitoes and are stain-resistant. All these functionalities require different chemistry, and product customisation is increasing.

THE CHALLENGE

The chemical treatment of textiles is mainly done by analogue processes, e.g. with traditional textile padding mangle machines (foulard machines). Impregnation of the textile in a padding machine is carried out in a trough that is filled with the textile chemicals. With that and comparable analogue technologies, the chemical mix is homogeneously distributed all over the textile. However, the drawbacks of these traditional analogue processes are a high volume of water required to dilute the chemicals, a large amount of chemicals (e.g. to fill the trough), a high consumption of energy to dry the textiles after chemical application and a lot of waste material due to the quantity of water mixed with chemicals which remains in the trough as waste water. An innovative and more sustainable technical approach seems to be needed to

"DigiTEXpro's aim is to digitalise the analogue process of chemically treating textiles"

This textile has been digitally treated with chemistry formulations to obtain both hydrophobic and hydrophilic properties. Water forms droplets with high contact angle on hydrophobic areas, whereas on hydrophilic areas the water penetrates the material

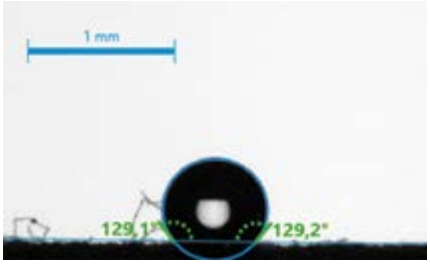

Fig.1: Water contact angle of a hydrophobic-treated cotton

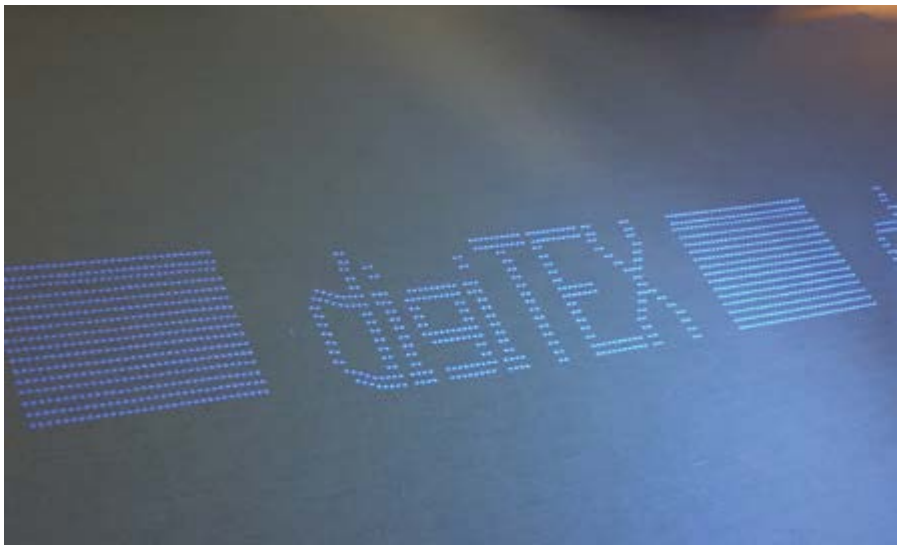

Fig.2: Digital printed optical brightener on cotton

meet the increasing ecological requirements as well as the requirements of the market that is facing a high product diversification.

CHEMICAL TEXTILE TREATMENT

The interdisciplinary team behind the DigiTEXpro project is addressing this topic and aims to develop a digital process based on technologies such as inkjet printing for chemical textile treatment. The project team consists of four German companies:

druckprozess, Suchy Textilmaschinenbau, Textilausrüstung Pfand, Zschimmer & Schwarz Mohsdorf and the German research institute STFI e.V.

- druckprozess is a provider of the inkjet technology for industrial applications. It sets up and tunes the print parameters, and develops new business models for this technology.
- Suchy Textilmaschinenbau is a manufacturer of textile machinery equipment and has a fundamental knowledge about special mechanical engineering for the textile industry.
- Textilausrüstung Pfand is a contract finisher of textiles and an expert in very delicate substrates.
- Zschimmer & Schwarz Mohsdorf is a manufacturer of textile auxiliaries with the ability to modify chemical formulations to become printable whilst maintaining functionality, even with an overall lower volume – thus facilitating higher-concentrated formulations with more intense chemical activity than those applied in analogue processes.
- STFI e.V. is the textile research institute of Saxony, and completes the partnership by testing and validating the samples.

By joining forces in this way, the project's aim is to digitalise the analogue process of the chemical treatment of textiles.

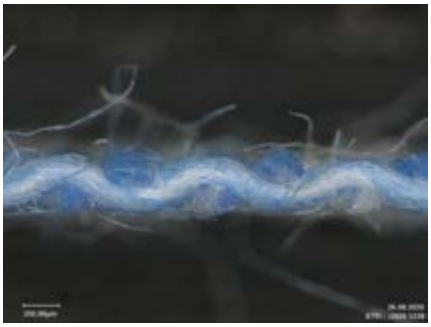

Fig. 3a: Cross-sectional image of a digitally-treated textile using minimum dot size (treatment made visible by blue colour)

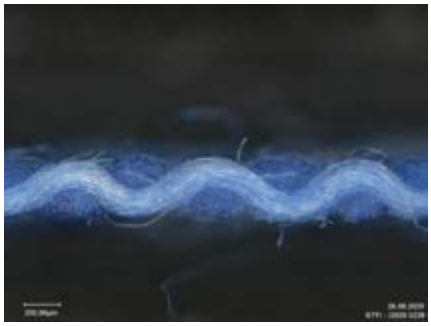

Fig. 3b: Textile that has been digitally treated using maximum dot size

PROGRESS

After research into the potential of digital printing technologies, a demonstration model was developed in 2019 and presented to the public at ITMA (International Textile Machinery Association) in Barcelona, the biggest tradeshow for textile machinery. The demonstrator can deposit about 60g/m² of chemicals while operating with a speed of 30m/min in single-pass mode. This performance is equivalent to the analogue process. Because the changeover from one chemical treatment to another one is much faster and produces low chemical waste, total productivity becomes higher and the process is more environmentally friendly.

Since the deposition process is fully digital, both a complete coverage/coating of the fabric as well as the deposition of the chemicals in patterns is possible. The combination of different functionalities on one textile in different areas will be investigated as well as the combination of multiple treatments.

ACHIEVEMENTS

Selected chemical auxiliaries such as hydrophilic or hydrophobic substances (see **Fig. 1**), optical brighteners (see **Fig. 2**) as well as flame-retardants were formulated to jettable inks and successfully applied on different textiles. Further functional formulations for the digital printing process to produce textiles with anti-bacterial and anti-wrinkle properties are still under development.

Since the deposition process is digital and the chemistry is applied in discrete, tiny droplets, required quantities of the functional substances can vary depending on the textile material and structure, and can also vary on one and the same textile depending on the position (of the treatment). With the minimum drop size, only the outer surface of the fibre is chemically treated (see **Fig 3a**), while with the maximum drop size, the full fibre is covered and penetrated with the functional substance (see **Fig. 3b**).

"Formulations to produce textiles with anti-bacterial and anti-wrinkle properties are under development"

The parameters need to be predicted and qualified and very often fine-tuned. These parameters can be stored in a database and make it convenient and secure for the operator to choose and re-open the settings for the production.

Overall sustainable impact is expected to be huge, because waste is reduced by 80–90% per batch; overall consumption of chemistry is reduced; less energy is needed to dry the textile afterwards; and finally, waste water from cleaning the system between different productions and batches is reduced compared to an analogue process.

DigiTEXpro is an ongoing project, which will last until the third quarter of 2021. The project is funded by the Federal German Ministry for Education and Research (BMBF) under the 'Twenty20 – Partnership for Innovation (German: Zwanzig20 – Partnerschaft für Innovation)' programme. ■

Jan Baden is CEO and founder of druckprozess

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INVESTED DEVELOPMENT

Jan De Roeck presents a five-stage maturity model for the print and packaging industry to assist businesses undertaking a digital transformation journey towards ultimate efficiency

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

Mattias Byström, President of Esko

For packaging suppliers, digitising the process by which packaging is made is the key to delivering long-term business success. Excellence in business performance – the value promise of digital transformation – leads to success by improving operational processes, lowering costs and delivering client loyalty.

Launching a new whitepaper and interactive maturity assessment tool for customers, Esko recently introduced its latest innovation to packaging and print suppliers across the globe: a strategic model to guide individual businesses on their entire journey to digital maturity. Developed as a result of analysing hundreds of customers' operations worldwide, the Digital Maturity Model for Packaging Suppliers (DMM) is a program to equip businesses to improve productivity, efficiency and overall profitability through a complete digital transformation.

The five-stage model addresses leadership concerns and workflow steps across every area of a packaging and print business. Through continuous dialogue and analysis, converters can develop their own roadmap to digital maturity – a hugely exciting step forward for the entire print and packaging industry.

IDENTIFY, MAP AND MOVE

The Esko DMM aims to help business leaders, IT managers and prepress staff better understand the prevailing leadership mentalities and behaviours across their operations, and in each business process workflow step.

Users can identify their current position on the model and establish a vision of some of the benefits awaiting them when they achieve higher levels of capability, which technologies to deploy and which behaviours to adopt to reach a higher stage of digital maturity.

After identifying their current stage of digital maturity, packaging and print suppliers can engage in a more thoughtful process of defining a strategy to move forward on the journey of digital transformation. Whether that be managing business risk, modernising the business, disrupting the status quo to drive the company forward or truly differentiating the business to create competitive advantage, the Digital Maturity Model provides clarity and guidance on the digital transformation process.

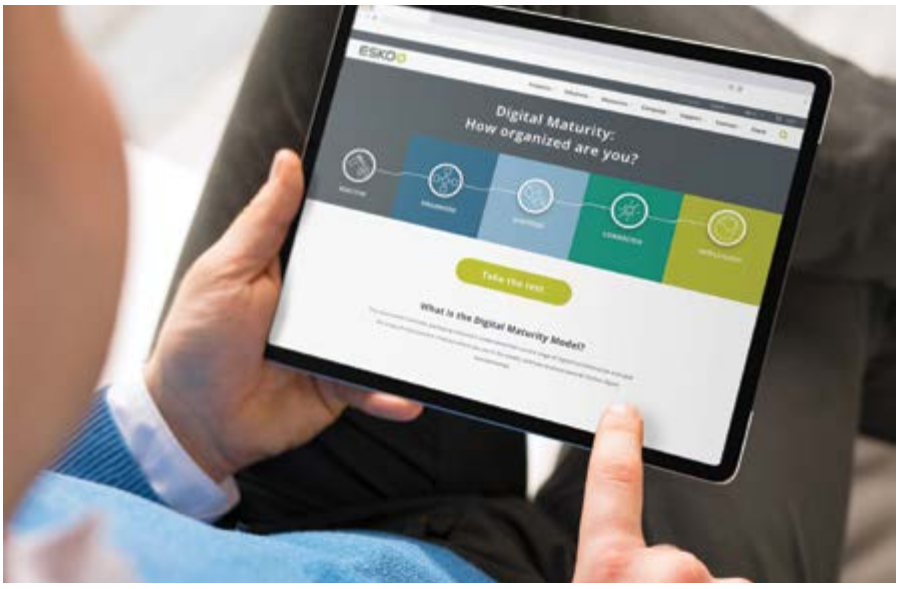
'The DMM equips businesses to improve productivity, efficiency and overall profitability through a complete digital transformation'

5 LEVELS OF MATURITY

As packaging suppliers experience internal and external pressures, their understanding of customer needs, and the processes that help them execute business, matures. As leaders define processes and stakeholders, roles and timelines, as they adopt digital technologies, and as they connect and automate those technologies, they cultivate efficiency in overall production and speed to market as a core business capability.

Esko has defined the five levels of maturity as Reactive, Organised, Digitised, Connected and Intelligent.

- **Reactive:** Tasks are completed manually and offline. Action is triggered exclusively by external pressure from suppliers and customers and lots of firefighting exists.
- **Organised:** Tasks are triggered by defined



Users can identify their current position on the Digital Maturity Model and establish which technologies to deploy and which behaviours to adopt to reach a higher stage of digital maturity

processes and timelines. Individuals use basic tools on computer workstations and increasing work volume is handled by the addition of headcount.

- **Digitised:** The 'work harder' strategy no longer works. Teams move processes online and execute tasks using hardware and software within those processes. Print and packaging projects are now digitally managed.
- **Connected:** Extension of capability stems from system and process connections. Integrating point solution software simplifies the workflow for individuals and teams. Packaging software gets integrated with other business processes and systems of record.
- **Intelligent:** Teams extend outside company walls to connect with customers and suppliers. User intervention and manual operations are minimised. Smart technology connects all equipment and work volume is dynamically planned to maximise equipment effectiveness.

The model examines the changes in maturity that are observed in leadership behaviour and concerns, and how this applies to each step of the packaging workflow process.

Leadership Concerns track the levers and performance indicators C-level executives and business owners are most interested in: Leadership Style, Innovation Model, Business Growth, Production Quality, Timeliness, Environment Sustainability and Equipment Effectiveness.

Packaging Workflow Process Steps outline the key challenges and activities that require strategy, process management and investment at each step: customer communication, internal communication, artwork preparation, good for print approval, sheet layout, platemaking, press, post-press and packing and shipping logistics.

From this vantage point of understanding at what stage the business resides, both from a leadership concern and workflow steps perspective, a clearly defined strategy can then be adopted for the successful digital transformation for the business.

ULTIMATE EFFICIENCY

Business leaders understand that digitisation is becoming critical to their business success. Digital transformation through the introduction of integrated, automated and cloud-connected systems serves to streamline processes, remove bottlenecks and improve efficiency across every facet of a business, resulting in tangible bottom-line success and clear competitive differentiation.

With businesses around the globe at various different stages of digital development – and in many cases with processes and functions within the same business at different points of automation – Esko has spent a significant amount of time mapping the dimensions of transformation to bring clarity and enable customers to purposefully drive their own digital transformation, rather than it drive them.

'By understanding at what stage the business resides, a clearly defined strategy can then be adopted'

Working with this industry-first tool and the experts at Esko, customers can identify and integrate only those solutions that will contribute to ultimate efficiency and business performance, addressing everything from leadership values and environmental sustainability challenges through to individual workflow steps and processes.

TAILORED STRATEGIES

Ultimately, the best recommendation of how to move forward comes from a mix of the learnings from all four strategies tailored to a specific business situation.

Working with a number of customers around the world and from across the packaging and print sectors to learn what works best, strategies have been designed to meet the needs of individual businesses and support them on their journey to digital transformation.

Key learnings can be summarised in three final thoughts:

- Before starting any further business investments, obtain a deep understanding of where you are today in your journey to digital transformation.
- Define a tailored 3-to-5-year plan for each of your business workflow process steps and apply the best matching digital transformation strategy to that plan.
- Focus on ensuring your investment strategy is well-documented and well thought out. Too many companies in the past have made erratic and emotional investment decisions 'to keep up with the market' or to react to customer feedback.

The Digital Maturity Model for Packaging Suppliers is a significant evolution for packaging and print suppliers, supporting them in their digital transformation and helping businesses achieve success by making step wise, strategically correct decisions on their journey towards digital maturity. ■

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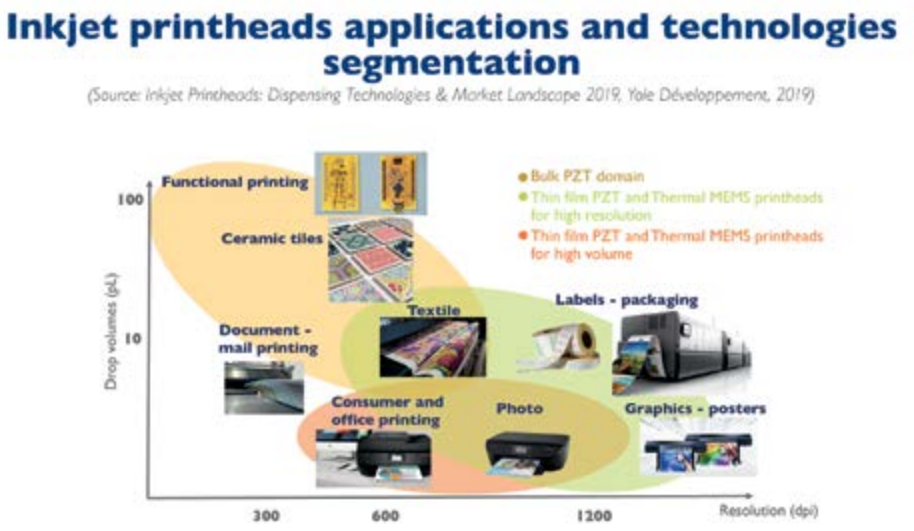
SURVIVAL OF THE FITTEST

Despite the effects that the Covid-19 pandemic is having on the inkjet market, Jérôme Mouly predicts a bright future for this ever-evolving technology

Jérôme Mouly is a Senior Technology & Market Analyst and Business Developer at Yole



The printhead market for functional printing applications is estimated to grow more than 26% from 2018 to 2024

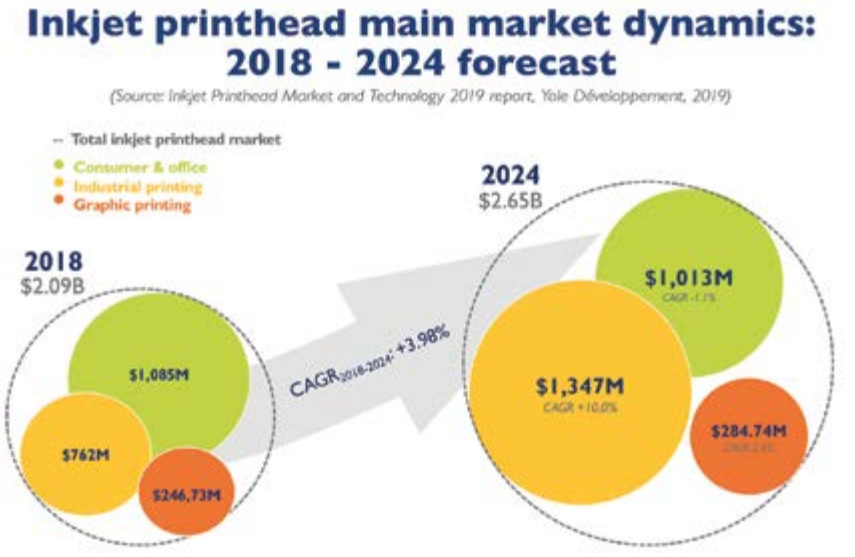
When the first inkjet printer was marketed in 1998 by Hewlett Packard (HP), it was surely difficult to imagine at the time that inkjet technology could print large format posters or decorate ceramic tiles, and would even be used to make electronic circuits or create three-dimensional objects.

Although now broadly mature, the inkjet printhead market continues to highlight market opportunities, meeting emerging needs in the digitalisation of the industry (Industry 4.0) and providing innovative technology solutions.

MARKET TRENDS

With a global market of US $2.7 (UK £2.1) billion revenue expected in 2024, industrial printing is fuelling printhead market growth with 10% CAGR [compound annual growth rate] over the same period. Changes in end-user needs, customisation and point-of-need requirements are motivating the industrial market, fostering digital printing with a huge interest in inkjet technology. Piezoelectric ejection printheads are dominant in industrial printing applications, with more than 85% of printhead shipments based on conventional technologies (non-MEMS [micro-electro-mechanical systems] -based printheads). On the other hand, the consumer market is expected to continue decreasing (despite a small rebound from HP in 2018, due partially to its ink loyalty program). A year on year decrease of 1.1% for consumer and office printing is forecast until 2024.[1]

"This health crisis could greatly accelerate certain applications of inkjet technology"



With a global market of US $2.7 (UK £2.1) billion revenue expected in 2024, industrial printing is fuelling printhead market growth

PANDEMIC IMPACT

But today, it is impossible to talk about the market without mentioning the Covid-19 pandemic impact. Like many markets, the printing sector has been impacted by the sanitary crisis measures implemented by different governments, imposing temporary factory closures, production slowdown, delays or stoppages of international trade as well as a restriction of labour to maintain distance between people.

The effects vary depending on the application and the manufacturers of inkjet printheads. HP recorded the largest decrease in Q2 2020 with -19% YoY compared to the same quarter in 2019 for its printing activity. Moreover, revenue from commercial printers fell by a significant 31%. Japanese firms, like Canon and Epson, are also experiencing some slowdown in revenue for commercial and industrial printing with flat to mid-single digit losses in revenue for Q1 2020 and are

expecting even greater losses in Q2 2020.

The complexity of the supply chain seems to have a big impact on companies, such as HP, which have partners all over the world compared to companies integrating most activities internally and suffering less from supply slowdowns. At mid-year, we estimate that sales volumes for industrial and commercial printers are expected to have fallen by 20%. Since the resolution of the Covid-19 pandemic is still very uncertain, these figures will require an update, and Yole is following the situation closely[2].

DIGITAL BENEFITS

As seen above, the impact of the pandemic creates exceptional and even unexpected situations. Beyond the negative effects, this health crisis could greatly accelerate certain applications of inkjet technology. Indeed, as consumer printers have seen increased demand due to the growth of 'working from home', some printing applications would benefit from the digital move. For example, the mass-produced textile sector is considered to be a major polluter, given the volumes produced and shipped all over the world. The use of inkjet technology for textiles could offer an alternative to traditional textile printing, allowing production according to demand and as close as possible to the end customer. The same occurred for the emerging electronics, dispensing and 3D printing markets. In addition to the aspect of proximity to the end customer, inkjet technology allows, for example, for contactless deposits of biological liquids highly recommended for biomedical applications, as well as the application of conductive materials for circuits in 3D form which are becoming increasingly important for flexible and conformable PCB applications. In addition, additive techniques are requested more and more by customers to avoid the cost linked to waste.

Printhead market for functional printing applications is currently estimated to grow more than 26% from 2018 to 2024[3], with strong interest from industrial companies like Fujifilm Dimatix and Konica Minolta. But the inkjet functional printing industry is still in a consolidation phase with strong competition in the OLED printing display market between Kateeva, JOLED and TEL. Also, the inkjet printing industry is attracting strong interest from semiconductor equipment manufacturers with the acquisition by Süss Microtec of the Pixdro assets from Meyer Burger. PCB manufacturing, sensors on flexible substrates, and micro-optics are emerging applications for inkjet technology.

TECHNOLOGICAL ADVANCES

From a technological perspective, inkjet technology is gaining in maturity and quality, with printheads enabling the ejection of specialty inks. Functional printing applications are examples of strong demand to eject conductive or dielectric inks. This requires printheads ejecting higher viscosities and bigger size particles. The growth opportunities in industrial markets for printed electronics, display, and biodispensing are contributing substantially to technology improvement.

Two major trends have been noted for inkjet printhead design: high-resolution printing and ink recirculation. High resolution is mainly targeting improved deposition quality for applications like graphics and poster printing. It has caused most piezoelectric printhead players that serve industrial markets to think about MEMS technology, allowing silicon-based and batch manufacturing approaches.

Manufacturers are using thin-film PZT deposition to create the ejection chamber instead of a piece of bulk piezo ceramic. Fujifilm Dimatix, Ricoh, and Konica Minolta (through the acquisition of Panasonic printhead assets) are already paving the way for MEMS thin-film piezo printheads. Thin-film PZT deposition is a real challenge, one that requires considerable experience. Xaar recently experienced the challenges of thin film PZT-based printheads and preferred to discontinue development to focus on bulk PZT technology. MEMS foundries are supporting certain OEM printhead makers to subcontract this particular manufacturing step, while other players are internalising MEMS production.

"Two major trends have been noted for inkjet printhead design: high-resolution printing and ink recirculation"

Conventional printhead makers are still innovating in this area, e.g. Kyocera improving its bulk PZT technology. It is also worth noting that new inkjet players are entering this mature market, players such as Suzhou RealFast Printing, the first Chinese inkjet printhead company with MEMS thermal inkjet printheads commercially available and currently in development for piezo printheads.

In the functional printing applications, recirculating ink printheads are a must in order to avoid clogging from inks containing large particles, as well as for single-pass printhead modules to increase productivity and lower maintenance issues. Among others, Seiko Instruments (SII) or Toshiba Tec have developed such ink recirculating printheads to address additive and functional printing applications.

It is clear that inkjet technology is not only a digital printing technology of choice, but is also now foreseen to 'manufacture' high-end products. New players in the field, the transition from printing to printheads, and new technology solutions for high quality ejection printheads allow us to say that there is no doubt about it: inkjet printheads have a very bright future, Yole's analyst will follow this evolution. ■

[1, 2, 3] *Source: Inkjet printheads: dispensing technologies and market landscape report 2019, Yole Développement*

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SCREEN TEST

Alan Buffington reflects on his screen printing career and explains how a well-made screen can be the starting point for many successful companies

Many screen printers start with the bare minimum of equipment. What is the first task? Learn to make a screen with an image. This first step is like magic for a beginner. How can a liquid coated onto fabric capture all this detail? After the screen is exposed, developed and allowed to dry, the screen is then attached to two door hinges or Jiffy Clamps and secured over a printing surface and soon the first prints are pulled. The emulsion may quickly break down since ink compatibility was not part of the purchasing criterion. Printing is done for as long as the screen can avoid breakdown.

For anyone at this stage, screen making will become a career-long effort to make better screens. Once the posters or shirts are dried/cured and are analysed and separated into good and bad prints, they are shown to family and friends. If the print was well accepted a sale or two may occur, and a young budding entrepreneur is born.

EARLY ADVENTURES IN PRINT

As one of my electives in high school I took an art class and enjoyed the creative process of screen printing and wound up printing hand bills for the school's open house. I found parents interested in grabbing one as a souvenir and found their admiration of a simple one colour print motivating. My parents were looking for a unique Christmas present and asked my art teacher for ideas and she directed them to a screen printing supplier in Los Angeles. I remember getting an 18xx multi-filament pre-stretched screen along with a pair of Jiffy clamps, a roll of hand cut lacquer film and lacquer thinner to adhere it to the screen. My friends were showing off their bikes or surfboards and they were looking at me wondering what I had done wrong that year to deserve these industrial supplies. It took almost half of the roll of film to master the adhering process and several weeks of trial and error to achieve a durable screen.

First I had to master cutting the lacquer film with an x-acto blade. Then learn how to peel off the areas to be printed and leave enough film to cover the screen. The art I chose was a composition of two race cars for the Indianapolis 500 in navy ink printed on red and light green charcoal paper my friend and I had found at the local art store. I enlisted my friend's help to carry the freshly printed posters and place them all over the living room of my parent's house to dry.

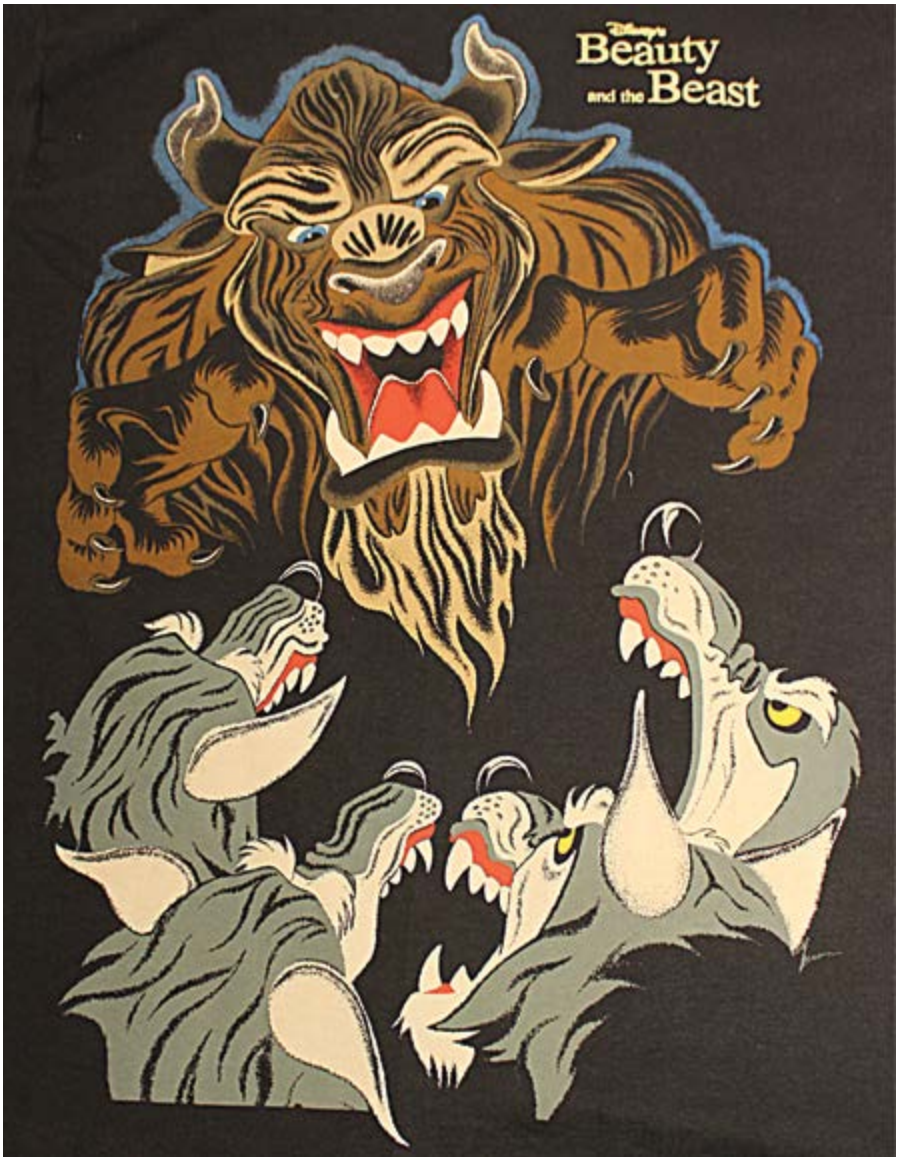
We printed 50 posters before the screen broke down and made a horrible mess of my mother's kitchen. We opened the windows and doors to air out the solvent smell and admired our efforts while learning what solvents cleaned the ink off the floor.

"What are we going to do with all of these?" my friend asked hoping his ordeal was over.

"Let's head to the mall and sell them!" I replied, watching his demeanour go from relief to questioning the friendship.

We walked around our local mall barking out, "Five dollars, five dollars, get your Indy 500 posters!" and after several hours of learning how to accept "No", we wound up selling most of them. What we couldn't get

Thanks to Colors Inc for this photo of their first screen



Beauty and the Beast poster printed by Bobcat in 1992

Vans logo designed by author in 1974, approximately (Copyright Vans: VF Corporation)

The Vans 'Off the Wall' logo – designed by author in 1974 and shown on footwear for the Space Station (Copyright Vans: VF Corporation

over was that we had close to 200 dollars in our pockets, which in 1968 was a substantial amount of money for two teenagers. We were hooked on screen printing. We went out and bought more mesh and rope to stretch on old wooden grooved frames; more hand-cut lacquer film and made more money that summer, all off of one 18xx screen.

GRADUATING TO BETTER THINGS

It amazed us how that screen could be so valuable for our teenage lifestyle. Eventually the 18xx ripped, and we went off to different colleges. In my dorm I found screen printing to be quite useful again to print air dry inks on white JC Penney t-shirts we bought for our dorm floor shirt. Soon other floors ordered. I had discovered screen printing emulsion and used a sunlamp to expose it with in my room. I waited until late at night and lined the edges of our hallway with the printed shirts, using the same Jiffy Clamp jig set up from high school. The dorm and team shirts earnings allowed me a small income for skiing, concerts and dates and an occasional flight back to Southern California for a winter surf session on homesick weekends when the surf was up and the winds offshore.

I have a client who was smart enough to save his first screen in business. Notice the corrugated staples of metal at the corners used to hold the home made frame together. This was Colors Inc.'s first job and the company is still located in Santa Ana California printing exceptional art. Like my screen he used multi filament mesh (the only kind available at the time) and two pieces of capillary film. He turned this into a three-colour job by printing sections of the design separately. All air-dried inks laid out for hours to dry. Both of us graduated to better mesh and emulsions and mortise and tenon wood frame bars, #5 cotton cord, staple tape, and stretched tighter, stronger screens and watched our businesses grow from one screen to hundreds.

SURF 'N SKATE

Eventually I got married, and needed a career as well as needing a second job to support my family. I started a small shop called Morning Sun Shirt Co in Costa Mesa with one of my co-workers from my night job working for the City of Newport Beach. Our first big client was Van's tennis shoes. I designed the Vans logo and the 'Off the wall' skateboard print and both were huge hits in 1973–1974. I walk by my local Van's store and I am amazed at how long the original art cut in Rubylith has lasted for the company, and I have seen the shirts in Europe, Central America and on any young skateboarder. It's now in space, thanks to Vans/VF Corporation supplying shoes for the Space Station.

All one colour work; no base plates; on homemade wooden three-colour table top 'flip flop' hand presses. Our growth was exponential. We printed for many local surf shops, Russell Surfboards, Hannifin, Haydu Kneeboards, as well as many construction companies and bars. The company was sold so my partner and I could move and was continued by the new owner, Kawii, who really built Morning Sun into the print powerhouse it became in Southern California while printing for Billabong and Nike and many others in an excellent 8-auto shop he built in Garden Grove that has since been sold.

BECOMING MERCHANDISERS

I started another company called Super Prints that printed for local surf shops, 15th Surf Shop, local corporation events, boating manufacturers, sport fishing boats and many other business genres. Quite often on deliveries to 15th Street surf shop I would be told Jack the owner was surfing, which would be at the surf break in front of his shop at 15th Street in Newport Beach. I'd grab my board and paddle out, catch a few waves and then drag him in to sign a check for the t-shirts – what a different world it was then!

'We printed 50 posters before the screen broke down and made a horrible mess of my mother's kitchen'

I found the LA Fashion market was booming with screen printing needs and had more work than anyone could handle. My first test order from a future partner was 10,000 units of cut piece fleece. The job required water-based foil adhesive for a new foiling technique that had just been introduced and my screens weren't holding up. I began a search for an emulsion that could hold up to water-based inks in the effort to make a better screen.

My future partner and I realised he could get more work than my crew and I could handle. We formed a new company with investors to get into automated equipment. His connections opened a floodgate of work in the first years from Disney, Mervyns, Pennys, Sears, and Walmart as we ventured into our own lines of clothing and became merchandisers.

The need for a very durable screen was now becoming a life and death issue for the company. Our schedules were tight; we couldn't have any delays to make on time delivery (the key to printing for the fashion industry). Our water-based and foil printing techniques needed better production yields. We improved our presses, exposure lights, and then discovered Aquasol TS – one of the first SBQ emulsions, made by Murakami, and still the highest resolving pure photopolymer textile emulsion available.

We did harden the screens, but more importantly we saw rejects go down, presses that printed non-stop with no screen breakdown, sharper print edges, finer halftones and I became a fan of Aquasol TS and bought mini drums of it.

QUALITY CONTROL

After writing this article it amazed me that a simple screen in high school could lead to a huge screen printing company that also discovered once again that a well-made screen made all the difference.

Now our industry is merging with digital printing which has the capability of taking over many facets of screen printing. For any young person starting out, the entry level cost of one screen, a squeegee and some ink is an easy door to open, while an automatic press with or without digital printing capability is out of reach for most. Digital printing is inevitable for many companies, from imaging screens directly, to outputting films, to a simple one shirt digital printer, but there are significant investments in these systems.

I look back at our cave man method for making Disney samples. Often the art was made using hand cut rubylith, pen and ink art on acetate with opaque India ink. Along the way we added a process camera, contact frame and an arc lamp and vacuum table to make an imaged screen. To sample, I would have a worker hold the screen while I pulled the squeegee to rush samples to our clients on a daily basis. No sample press, just line up the screen to previous prints and print all the colours along with puff ink and foil adhesive, and get good at it enough for the print to sell. All done with one screen at a time on a print table system of various sized shirt pallets.

One screen; that's all it takes whether you are a garage printer or a production powerhouse – the screen is the door by which many companies get started and succeed. ■

Alan Buffington works in California, USA

All images supplied by Alan Buffington

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MITIGATING MIGRATION

Dr. Simon Daplyn looks at how digital printing supports safer food packaging and explores the challenge of finding a non-harmful, effective ink that works across different substrates

Dr. Simon Daplyn is Marketing Manager at Sensient

When it comes to food packaging, manufacturers are having to address a growing number of requirements to deliver solutions that prevent contamination, stand out on busy store shelves and communicate key nutritional information, as well as meeting consumer expectations for sustainable materials to protect precious natural resources.

Digital printing gives packaging manufacturers an effective and flexible way to differentiate their offering on the shelves, provide accessible information and offer appealing branding for a wide range of consumer goods. However, finding a digital ink that works across different substrates without the use of harmful chemicals, while offering precise and vibrant results, can be challenging. Manufacturers also face fragmented regulations and legislation which, in a global marketplace, can prove difficult to navigate.

Ink migration – where volatile compounds within the ink migrate through the packaging to the foodstuff – is one of the biggest concerns when looking for food-safe inks. If migration isn't mitigated, consumers could be at increased risk of exposure to harmful substances in food and drink. In this article, we explore what the migration process means for packaging manufacturers and how, by choosing the right digital ink solution, it is possible to achieve high quality, safe and appealing food packaging.

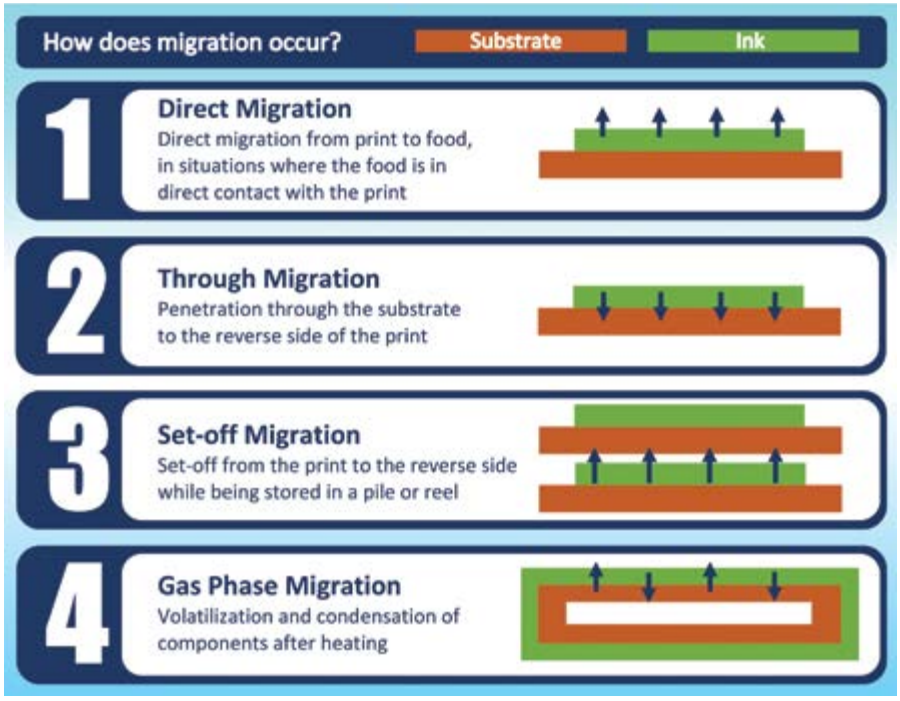
'Migration compromises safety and quality, putting the consumer and brand reputation at risk'

WHAT EXACTLY IS MIGRATION?

Migration occurs when substances within an ink pass through the substrate and contact with foodstuffs. The choice of ink is therefore crucial as migration compromises safety and quality, ultimately putting the consumer at risk and jeopardising brand reputation. Ink migration is a complex process and can be categorised into three distinct categories:

1. Set-off, which occurs when ink residue migrates following the drying stage, from one substrate to another, commonly from a printed surface to food-contact surface
2. Diffusion, when smaller, more mobile molecules diffuse through the packaging layers into food
3. Gas-phase, when ink migrates from cardboard packaging through the inner 'gas pouch' to reach foodstuffs.

There are a number of factors which affect the likelihood of migration occurring. For example, the extent of ink migration is dependent on the packaging material porosity, with more permeable materials typically presenting an increased risk. Printing on aluminium, metal or glass materials measuring over 7 microns, for instance, may help to prevent migration as they are classed as a permanent barrier. Cardboard, plastic or other thin materials, however, are classed as non-barriers and carry a greater probability of migration. The type of food and the intended use also affects the extent of the process. For example, a flexible pack intended for microwave processing will have different limitations than a more standard flexible packaging.



Overview of the types of migration that may occur after printing

WHAT DOES THIS MEAN FOR MANUFACTURERS?

Packaging manufacturers need to make sure that a balance is achieved between using more sustainable materials, providing high-quality colour application, and ensuring that any migration risk is lowered. Although the use of recycled materials is a positive step in the reduction of waste across the food industry, the packaging itself can be a source of contamination – with a risk of chemicals in the packaging accumulating over time.

The regulatory landscape is also difficult to navigate. Legislation on the use of inks in food packaging differs across the world, with no uniform way of enforcing safety standards.

In Europe, for example, [EEC] guidelines on food contact materials (FCMs) have not evolved in line with innovation in digital printing and have not been updated recently. Switzerland has legislation in place for food packaging printing inks – the country has a 'positive list' of substances that can be used in the manufacture of plastic and silicone articles, as well as printing inks. In the USA, any inks migrating into food should be compliant with food additive legislation and classed as 'Generally Recognised as Safe' (GRAS) – even if they fall below regulation thresholds. With such a diverse mix of legislation in place globally, it is the responsibility of brands to self-regulate, and to ensure that any substances used for printing on food packaging provide no risk to human health.

Print is an essential part of food packaging, attracting and informing the consumer

WHAT IS THE SOLUTION?

Finding an ink solution that meets fragmented global legislation, while also delivering on performance, may seem like an impossible task. However, the emergence of water-based digital inks that are fast drying, low odour and flexible in terms of substrate present a promising option for packaging manufacturers looking to mitigate the migration risk.

According to Transparent Market Research, the popularity of water-based inks is being felt across the packaging industry and is set to expand at a compound annual growth rate of 6.45% from 2019–2027 as manufacturers seek to provide consumers with a packaging solution that avoids the volatile organic compounds (VOCs) found in solvent-based inks.

Providing a cost-effective, compliant alternative by using water as the solvent instead of potentially harmful substances, water-based inks not only provide high-quality, precise colour application through complex chemistry but also reduce the environmental impact of businesses. Plus, crucially, in standardised test conditions water-based inks were found to achieve lower migration potential – both in digital printing and inkjet applications.

By also harnessing the benefits of digital printing – including little or no setup required, and the flexibility of unlimited colours and no design limitations – water-based digital inks put manufacturers in a prime position to deliver the highest quality and safest packaging designs.

MEETING THE MIGRATION CHALLENGE

Collaboration is key to overcoming the migration challenge. It's only by identifying the specific requirements of the packaging and working closely together that an effective solution can be created that exceeds both performance and regulatory expectations. With a full understanding of market needs, processes and legislative requirements, ink manufacturers work in partnership with customers (OEMs, integrators, brands) to deliver greater efficiency and ensure confidence in compliance for printing professionals.

SensiJet SX, a versatile aqueous ink platform for printing on both non-porous and semi-porous substrates, is part of Sun Chemical's development portfolio. In line with Sun Chemical's commitment to innovation within printing inks for packaging, this solution is being further optimised for use with primary food contact materials. With performance characteristics, such as adhesion, durability and jetting, the SX series offers an environmentally-friendly option for packaging applications.

'The popularity of water-based inks is being felt across the packaging industry'

With the regulatory landscape proving difficult to navigate, and consumer demand only increasing, it is crucial for manufacturers across the industry to understand both the implications of migration and how they can protect themselves and consumers from its consequences. By harnessing the power of water-based, digital solutions, manufacturers can ensure that their operations and processes are future-proof for years to come. ■

For more information on Sun Chemical's acquisition of Sensient, visit www.sunchemical.com or www.sensientinkjet.com.

Dr. Simon Daplyn is Manager of Product Marketing at Sun Chemical

Typical packaging application where print is a key part of the presentation

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MANUFACTURING EXCELLENCE

Steve Wakefield explains how a manufacturing philosophy for precision inkjet has advanced Sericol screen and flexo inks across the globe

Sericol is a long-established name in screen and flexo printing, recognised for high quality inks that are used across a range of applications and industries. Founded in the 1960s, Sericol is now the screen and flexo products brand of the Fujifilm Ink Solutions Group, which are manufactured at facilities in the UK and India.

It was the success of Sericol UV screen products that led the business to be the first company to commercialise UV inks for inkjet in 1999. Then the rapid evolution of Fujifilm technology and manufacturing processes in inkjet, where inks require very high tolerances in their specification, enabled advancements in the production of screen and flexo inks. Now with large-scale manufacturing of inkjet, screen and flexo inks, best practice is shared across the business, ensuring continuous improvement in every aspect of its operations. Today, Sericol inks are manufactured to meet the highest standards for quality and consistency, with operations built on five key areas of manufacturing excellence:

Sericol inks are manufactured to meet the highest standards for quality and consistency

1. QUALITY AS STANDARD

Quality assurance is the foundation of both manufacturing sites, with stringent quality control checks and balances at every step, helping to achieve right-first-time manufacturing rates of 97%. This adherence to quality ensures consistent production of stable and reliable Sericol products, batch-to-batch, year after year. Quality extends right across the globe, with the UK shipping to 86 countries and India supplying 37 countries, via a global logistics operation.

2. CERTIFICATION

Both manufacturing sites are proud of the numerous standards and certifications they have worked hard to achieve and maintain. Robust practices run across all four pillars of manufacturing operations, encompassing health and safety, environmental, processes and quality standards. These practices underpin a wide range of accreditations and certifications, including ISO 9001 (quality), ISO 14001 (environmental) and ISO 45001 (health and safety).

3. RESPONSIBLE PRODUCTION

With a business-wide commitment to sustainability, Fujifilm has invested in technologies to minimise the environmental impact of its ink production. For example, it has a zero to landfill policy for packaging and production waste. In the UK, 'waste' heat energy from production processes and compressed air generation is used to provide 70% of the heating. Additionally, a field of solar photovoltaic panels produce electricity to reduce its reliance on external energy sources.

Triple roll mill white ink. Using the latest analytical equipment ensures ink formulations can be precisely controlled

4. TRACEABILITY

Fujifilm works directly with raw materials suppliers to ensure the quality journey begins even before manufacturing starts. It invests in the latest analytical equipment, enabling monitoring of raw materials so the quality of the ink formulations can be precisely controlled. With integrated tracing, every batch of product can be tracked through the entire supply chain, from raw material through to delivery.

5. EXPERT PEOPLE

Dedicated teams of experienced chemists, application specialists and manufacturing teams continually leverage the combined expertise of the Fujifilm Ink Solutions Group to deliver the highest quality products. They ensure that Sericol is a brand printers can continue to trust for ultimate reliability in their screen and flexo print processes. ■

Steve Wakefield is Marketing Manager at Fujifilm Ink Solutions Group

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PRINTING UNITED DIGITAL EXPERIENCE

Taking place online, the Printing United Digital Experience provides free resources from 26 October until 12 November

Experts will present on the latest topics and trends, areas of opportunities, and research to industry verticals across the board – all free of charge.

"In creating all aspects of the event, including setting the stage for product launches and demonstrations, research, and panel discussions, we were also mindful to offer education at no cost to the industry," said Mark J. Subers, President of Printing United. "During a pandemic, especially, staying on top of the latest trends and continuous learning still needs to take place. This is our dedication to the industry in keeping all of that moving forward.

"Companies that are usually limited to sending only a handful of employees to the in-person Expo due to budget constraints can now take advantage of world-class education, available at their fingertips, for every employee at their company regardless of their position or years of experience. Dive into sessions, queue the event up each day in the background while you work, and come away with a valuable experience over these 14 days."

SESSIONS FOR THE WHOLE TEAM

Each week the Digital Experience will spotlight a different market segment, including graphics/wide-format, apparel, commercial, packaging, mailing and fulfilment, workflow and software, industrial, and digital textile. The event begins each day with a special keynote address, followed by a detailed schedule of educational sessions and panels, product spotlights and unveilings, and more. ■

Further information:
web: www.printingunited.com

IMPRESSIONS EXPO 2021

Impressions Expo Long Beach will return to West Coast USA on 22–24 January 2021

After a largely successful 2020 event with more than 300 top industry exhibitors, 40 content-rich seminars and workshops taught by expert speakers, and a party for the history books, Impressions Expo Long Beach will return in 2021.

"The support and desire for Impressions Expo Long Beach to stage this January has been absolutely overwhelming," explained Josh Carruth, Show Director of Impressions Expo. "It's clearer now than ever what this event has come to represent for our community and the desire to move forward into whatever 'normal' lies ahead of us. Our promise as 2021 approaches is that we will continue to monitor and evaluate every option and place the health and safety of our community at the heart of every decision."

Garment decorators will once again be able to visit with top exhibitors and witness new product launches in screen printing, embroidery/digitising, heat-applied graphics, digital decorating and more. The impressU conference programme is aimed at businesses looking for new ways to grow and improve. Industry experts, including a few new faces, will also be sharing their knowledge on a variety of categories and topics.

SPECIAL EVENTS

Other returning special events will include:

- Shop Talk: featuring brief, on-point, 20-minute discussions involving the best and brightest in the industry sharing their expertise and visions.
- Innovation Zone: showcasing the manufacturing life cycle of a printed garment, starting with apparel production through to the finished, packaged merchandise.
- Onsite Learning: including 45-minute sessions on the show floor covering everything from marketing success to understanding new and cutting-edge technology.

Impressions Expo has always kept the health and safety of the decorated-apparel community in mind. See website for all the latest developments regarding the 2021 schedule. ■

Further information:
web: www.ImpressionsExpo.com/longbeach

IJC 2020 CANCELLED

'See you in 2021': The Inkjet Conference will not take place in Düsseldorf this October

ESMA, organiser of The Inkjet Conference, has taken the decision to cancel TheIJC 2020.

"Over the last months we have received immense support and positive feedback on the event, however the reality of corporate travel bans, border restrictions and continued uncertainty as to the evolution of the Covid-19 pandemic have forced us to cancel this year's edition.

"We are looking forward to welcoming the inkjet industry to TheIJC in November 2021. Please follow the updates on the conference website, our LinkedIn page and YouTube channel." ■

Cancelled: offering a mix of educational and networking opportunities, TheIJC is the meeting point of the inkjet industry

Further information:
web: www.theijc.com

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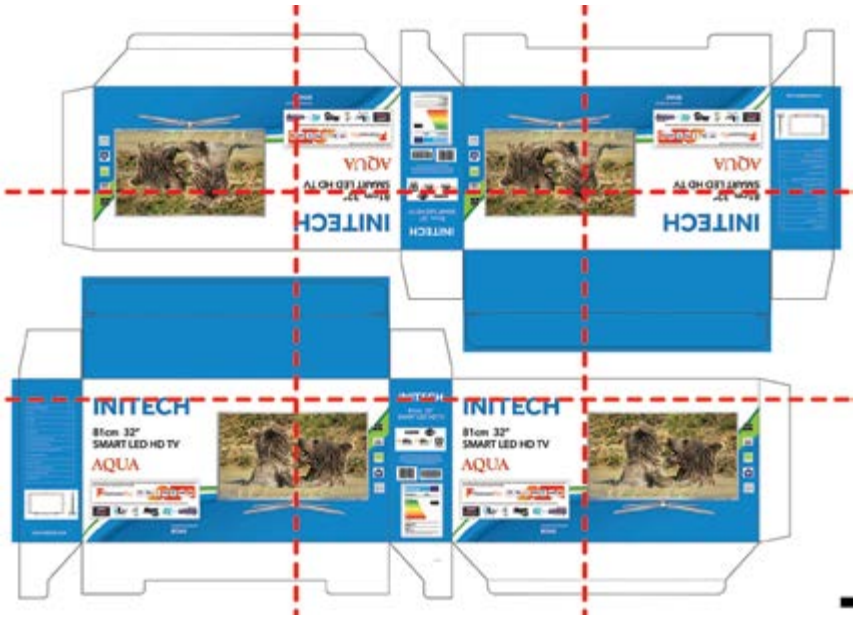
DO YOU HAVE NEWS TO SHARE?

CONTACT: nicola@specialistprinting.com

Global Graphics expands Harlequin RIP for large scale output

Version 13 of software developer Global Graphics' Harlequin Host Renderer (HHR) RIP has added automatic tiling to maximise throughput of huge PDF, TIFF and JPEG files such as those generated in the corrugated packaging, wide and grand format, décor and textile markets. Harlequin 13 automatically tiles these large pages – some can be up to 200m long – to split them across multiple RIPs for increased speed and improved load balancing. Output is continuously streamed to the printer so that print service providers don't have to wait for the entire page to be RIP-ed before printing can begin.



Harlequin 13 introduces a new tiling feature specifically for high-speed digital printing

"The new tiling feature is specifically for high-speed digital printing," stated Martin Bailey, Global Graphics Software's CTO. "Automatic tiling helps in maximising throughput by splitting the output across several RIPs. It also reduces the cost for a digital front end (DFE) built to handle huge PDF pages, either every day or as an occasional occurrence, because the peak memory usage for a tile can be much lower than that for the whole page.

"Speed continues to be a key focus of Harlequin development, because a faster RIP enables presses with very high data rates to be driven at engine speed and reduces the bill of materials for a DFE or controller," Bailey concluded.

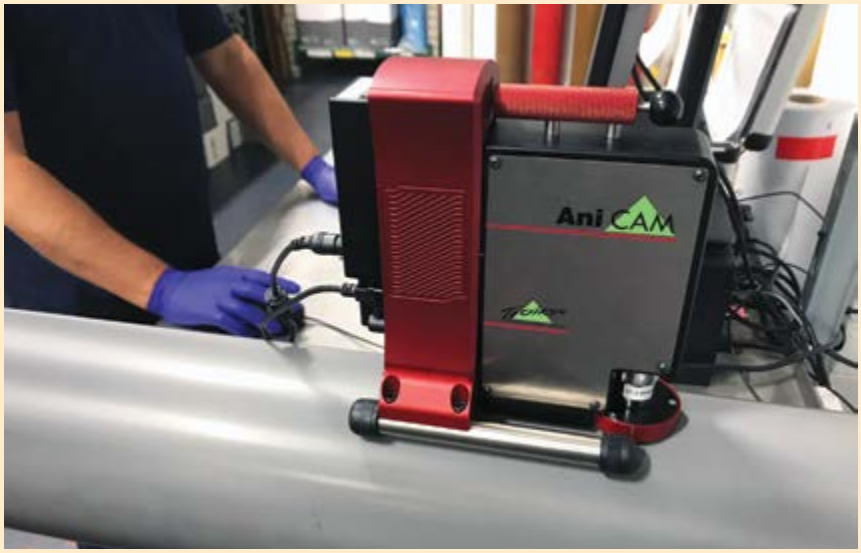
Other features introduced with Version 13 include: direct printing of PNG files; enhanced controls over sizing of output from image file formats such as TIFF, JPEG and PNG where the image does not specify a size; Extended Advanced Inkjet Screens with the introduction of Opal; and extended support for larger DFEs.

HHR is supplied as a component or pre-packaged with a parallel processing pipeline as Harlequin Direct. The new RIP is supported on 32- and 64-bit Microsoft Windows, 64-bit Linux and Mac OS.

www.globalgraphics.com ■

Troika investment boosts efficiency at Parkside

Parkside Flexibles, a specialist in the flexible packaging sector, has invested in Troika's AniCam 3D digital scanning microscope, along with AMS software to measure its flexographic plates and anilox rolls. The AniCam and AMS software have been installed in a dedicated prepress area on the shop floor.



Parkside is using Troika's AniCAM scanning microscope to measure its flexographic plates and anilox rolls

"What we wanted to ensure was ease of use and clear integration into our prepress process," explained Mark Benson, Print and Lamination Specialist at Parkside. "This allows an anilox to be delivered to the prepress area quickly, be cleaned and checked using the AniCam, and returned for use on press within eight minutes.

"By implementing the AniCam, the team at Parkside can now verify the condition of their anilox rolls to ensure they are meeting the required ink densities and achieve the premium print performance they are seeking," said Jon Jordan, Sales Director at Troika Systems. "We're delighted to hear that after its successful use at the Parkside, Normanton site, their Selangor, Malaysia facility is also installing the solution to support its Asian print business."

www.troikasystems.co.uk ■

Color Concepts creates cloud-based marketplace

Independent professional services provider for the digital wide format printing industry, Color Concepts, has launched ColorBase Exchange – a cloud-based platform to connect printing material manufacturers with resellers. The new technology is designed to match supply and demand and assist users by streamlining data exchange, procurement, the sales process, customer acquisition, payments and logistics.

Material manufacturers will benefit from the global reach to build partnerships and generate exposure for their newest products. Resellers will be able to manage their entire workflow from through a single channel, while simultaneously increasing product selection and diversifying supply chain risk.

"The past couple of months have shown that a disruption of patterns can lead to entirely new challenges, for both manufacturers and resellers," said Marco Roos, CEO and founder. "It also showed the vulnerability of systems and markets and the inability for companies to react fast to an ever changing situation. ColorBase Exchange does not aim to change the current market structure, but rather to optimise it and help resellers and manufacturers to interact more effectively, streamline their processes and adopt new, agile methods of manufacturing and procuring materials," Roos concluded.

Color Concepts' ColorBase Exchange marketplace matches supply and demand to help resellers and manufacturers interact more effectively

Color Concepts believes that ColorBase Exchange will contribute to a substantial increase in the efficiency and effectiveness of decision making between supply and demand. Joining requires no upfront investment or subscription fees.

www.colorconcepts.nl ■

Action Engineering offers pallets for Kornit DTG face mask printing

US-based manufacturer of screen printing production accessories Action Engineering is offering Kornit face mask pallets to assist with DTG printing jobs currently in high demand due to the Covid-19 pandemic.

Different styles of face masks require different pallets. The Kornit-style Form Fitted Pallet design is made for form-fitted masks with a chin seam. It has an interchangeable chin seam easement plate and loads by hooking the face mask in the back; then pulling it toward you. The print area is 5.75ins x 3.75ins.

Action Engineering's Flat Pallet design is made for flat-fitted masks that have no chin seam. It loads by placing the mask on top of the plate and closing the pallet to flatten. The print area is 5.75ins x 3.25ins.

The Universal Face Mask Pallet is a small hold down used for small prints on either flat or form-fitted face masks. The print area is 3ins x 3ins: suitable for a small print on any face mask.

Custom face mask pallets are available with a four-piece minimum order. A mask sample must be provided for the custom option.

Action Engineering ships worldwide and welcome international orders.

www.actionengineering.com ■

Action Engineering's Kornit Style Flat Pallet with 5.75ins x 3.75ins face mask print area

Marabu develops UV-LED curable screen-printing inks for use on glass

In response to the trend for using advanced and eco-friendly inks in the glass industry, Marabu has developed Ultra Glass LEDGL – a range of UV-LED curable screen-printing inks especially for use on glass.

By co-operating closely with glass-manufacturing companies, the ink manufacturer, based in Germany's Stuttgart region, develops tailor-made solutions for highly specific needs. In particular, Marabu has partnered with enterprises interested in or already using UV-LED curing to develop a special UV-LED curable screen-printing ink especially for glass.

The Ultra Glass LEDGL range is said to have excellent properties in terms of initial adhesion, opacity, gloss and reactivity. It includes brilliant and high-gloss colours, plus highly opaque inks for greater visibility on dark substrates. Furthermore, the special LED-compatible formula of Ultra Glass LEDGL inks enhances initial adhesion and abrasion resistance shortly after printing. UV-LED curing also supports pinning – the use of an intermediate curing process that enables 360-degree decoration of round objects, such as hollow glass containers.

The versatile new inks are suitable for printing on glass packaging, e.g. beverage bottles as well as flat glass for use in interiors. On metal surfaces the LEDGL inks offer appropriate adhesion and resistance to chemicals, water and abrasion. They can also be used for decorating – for example fragrance bottles in the cosmetics industry, plus glassware for the hospitality industry, glazed ceramics, anodised aluminium and painted surfaces.

Depending on where and how the printed item will be used, the substrate will need to be pre-treated. Ultra Glass LEDGL is a two-component ink, therefore an adhesion modifier must be added for proper application and the best results. ■

Ultra Glass LEDGL is Marabu's UV-LED curable screen-printing ink developed for use on glass

InkTec toughens up floor graphic media

InkTec's multi-purpose floor graphic media is designed to be tough and hard-wearing

Recognising the significant demand for floor graphics at the moment, InkTec Europe has introduced a more resilient product. The Oxfordshire-based manufacturer has created a multi-purpose floor graphic media which is R12 slip-resistance certified (DIN-51130 by IFA). Improved resilience is due to a combination of PVC and fabric, in addition to being thicker (at 450gsm) than standard floor graphic medias. The practical media can be used for floor graphics and signage on various surfaces including carpet, rougher textures and even applied to walls.

"We have been keeping a watchful eye on what has been going on with floor graphic media over the last few months particularly since lockdown has eased," said Peter Davidson, Head of IP Consumable Sales. "One thing that struck us was that there was a need for a material that was tougher, hard-wearing but also offered that all important slip-rating. This is going to become increasingly important as we head towards cooler months in the autumn and people migrate more inside. It is going to be essential to continue to remind them of social distancing and this product is ideal at acting as this constant reminder."

InkTec's rugged new floor graphic media requires no additional protective laminate. It is suitable for retail and leisure environments, particularly for indoor applications or shorter term outdoor use in dry situations. The material is available in a matte finish and comes in 25m rolls with a width of 54ins.

www.inktec-europe.com ■

Vastex updates DTG dryer to assist smaller print shops

The LittleRed X1D-54 conveyor dryer from Vastex is now equipped with a 137cm (54ins) wide conveyor belt to offer smaller shops greater capacity and flexibility to cure DTG-printed and/or screen-printed garments.

Equipped with a 122cm wide heater, the dryer can cure up to 46 garments per hour DTG-printed with digital white ink at three minutes dwell time, 162 garments per hour screen-printed with water-based ink or discharge, and 324 garments per hour screen-printed with plastisol inks.

Designed to handle the output of popular DTG printers as well as screen-printed garments, in small spaces with improved image quality at low cost, the X1D-54 is also suitable for the curing of DTG pre-treatment, and offers greater production capacity with less operator attention while eliminating the flattened, ironed-on appearance of heat pressed images.

Equipped as standard with features found on the company's larger DTG-capable dryers, the new model has a newly redesigned air mapping system that pulls fumes and moisture away from the immediate environment while providing air flow to cool the skin of the heating chamber for operator safety.

Fully expandable, Vastex' X1D-54 dryer can accommodate additional heating chambers and belt extensions, allowing capacity/belt speed to be doubled or tripled as needs grow.

www.vastex.com ■

Vastex' LittleRed X1D-54 conveyor dryer offers small businesses greater curing capacity and flexibility

Simon Jones, General Manager of Cadillac Plastic

Cadillac Plastic appoints general manager

Supplier of plastic films and filmic adhesives, Cadillac Plastic, has appointed Simon Jones as General Manager. Jones joins with 35 years' experience within specialist screen printing and industrial films and chemicals manufacturing.

"I am delighted to be joining such a highly experienced, customer focussed team, and well-respected company within the industry," said Jones. "I have a very 'hands on' approach and look forward to working with Cadillac customers to help them solve production-related problems and achieve efficiency gains."

Cadillac Plastic's head office is located in Swindon, UK. The company supplies products to customers across a range of industry sectors and its plastic films and filmic adhesives are increasingly being used within automotive interiors and displays, aerospace and mass transport and electronic switch applications.

www.cadillacplastic.co.uk ■

Mimaki Europe appoints new Managing Director

Takahiro Hiraki has been appointed Managing Director of Mimaki Europe.

Hiraki joined Mimaki Engineering in 1997 as a sales representative for the Mimaki CF-series. Over the next 20 years, he remained with the company, developing his expertise in the technology and advancing his sales career in various senior positions. As Hiraki's career progressed, he became responsible for larger teams and Mimaki's success in new and emerging markets as the company expanded its solutions. In 2019, Hiraki joined the board of directors and was assigned management responsibility for Mimaki Europe.

Takahiro Hiraki, Mimaki Europe's new Managing Director

"From very humble beginnings in a prefab building and one of only 180 employees selling cutting plotters and CAD plotters, my Mimaki journey has been one of industry innovations, technology break-throughs and significant growth," Hiraki reflected. "My goal as MD for Mimaki Europe is to further develop relationships with our partners and customers to meet the evolving local needs of these businesses and take Mimaki Europe into its next phase of success."

Hiraki succeeds Yuji Ikeda who commented, "I am confident that Hiraki will lead this newly bolstered team to achieve great things in the months ahead, despite the unprecedented and challenging situation we have all faced this year. I wish him and Mimaki Europe every success."

www.mimakieurope.com ■

adphos aNIR dryers evaluated in productivity study

Inkjet Insight has published a whitepaper titled 'Drying Matters – The Impact of Drying on Inkjet Performance'. The study was conducted following multiple successful installations of adphos aNIR dryers on HP T-presses of 20-, 30- and 40-inch printing widths for increased productivity. When the analysts at Inkjet Insight heard about the performance gains, adphos and a leading print service provider in the USA agreed to jointly run a productivity study on T400 series presses with/without adphosNIR drying.

Both presses were installed at the same PSP location. One press was configured with three existing HP OEM drying modules and the second press was retrofitted with one adphosNIR module alongside the two remaining previously installed OEM drying modules.

Using aNIR drying, the following results were recorded: speed of high coverage sample job increased by 60%, from 152m/min to 244m/min. Medium coverage job speed was increased by 33%, from 183m/min to 243m/min. During testing on the aNIR-equipped press, yellow rub-off was greatly reduced, both eliminating ink transfer when stacking on staging carts, as well as eliminating finishing jams caused by wet or tacky ink. On the aNIR-equipped press, stack height was significantly reduced, increasing offline finishing speeds.

The full white paper is available to download from Inkjet Insight's website www.adphos.com ■

adphos' upgrade kit for HP's T400 inkjet press can increase printing speeds by up to 60%, according to Inkjet Insight's study

Inkcups releases Vivid White digital ink

The latest addition to Inkcups' S1 UV ink series, Vivid White can print a bright white on dark substrates, and can also act as an opaque white background for multi-coloured graphics.

Vivid White is the newest addition to Inkcups' S1 UV ink series

"We have been working for a few years to find the ideal pigment combination to provide the brilliant white opacity in combination with easy jettability," said Ben Adner, CEO of Inkcups. "Our new Vivid White really makes a visible difference and after extensive testing we believe it is the brightest white in the market."

The new ink is fully compatible with Inkcups' range of digital printers and is a pour-over for printers already using the company's S1 ink – eliminating the need for customers to flush their machines when switching to the white ink. It can also be used in other printers where improved white opacity is needed.

Suited for a variety of substrates including stainless steel, coated metals and plastic, Vivid White can also print on a wide selection of flat and cylindrical objects. Applications include drinkware, injection-moulded housings, promotional items and electronics.

Vivid White digital ink is engineered and manufactured in the USA and available for order now.

www.inkcups.com ■

Inkcups' Vivid White ink enables reproduction of vibrant white areas on a variety of dark substrates

GIS replaces ticketing system with Customer Hub

GIS' Customer Hub provides 24/7 access to commercial and technical information

Developer and supplier of industrial inkjet solutions Global Inkjet Systems (GIS), has launched a new Customer Hub to provide 24/7 access to commercial and technical information on GIS' Atlas software, hardware and ink/fluid delivery systems. The Hub replaces a previous ticketing system.

To make it easier for GIS customers to work on projects using the company's industrial print technology, the Customer Hub acts as a one-stop platform, offering users instant access to product information, software updates, technical support, documentation and order & returns tracking – accessible at any time,, anywhere in the world.

"With the introduction of the Customer Hub, GIS continues to offer higher levels of customer support, further minimising time to market," believes Laura Able, Head of Customer Experience. "The new portal takes our service to the next level, giving businesses complete visibility on their service, commercial, training and ordering needs – their teams can access all the information they need, whenever they need it."

The GIS Customer Hub is available to registered GIS customers.

www.globalinkjetsystems.com ■

Mondi expands portfolio for premium paper and packaging market

Paper and packaging supplier, Mondi has launched 31 new colours in its premium Pergraphica range. The portfolio includes a variety of dark and deep shades and the recently launched Pergraphica Infinite Black, all suited to luxury packaging as well as boutique bags. The expanded Pergraphica range includes additional laminated grades up to 400g/m² and a widened HP Indigo offering.

"Despite the difficult situation we are all facing this year, we have been keeping close to our customers and working intensively on our new uncoated fine paper products. We are pleased to present the impressive results to the market now," said Gunilla Saltin, CEO of Mondi Uncoated Fine Paper.

To mark the portfolio extension, Mondi partnered with Adobe Stock for a 'Catching Feels' campaign. Designed to evoke six feelings a 'sensory journey' starts on paper with a lookbook featuring two surface finishes, four printing techniques, six paper weights, ten shades and 53 pages of special inks and finishes, and continues on Mondi's digital platform, mymondi.net. The photographers and illustrators featured in the campaign contribute to the Adobe Stock Premium Collection image library.

In close collaboration with customers, Mondi has also developed a grass paper for premium packaging. IQ Grass+ Packaging is composed of 30% grass fibre and 70% fresh fibre from sustainable resources to produce a product with a natural look and feel, suitable for premium shopping bags as well as liners for high-quality corrugated and solid board packaging. It has a high tear strength, is optimised for flexo printing, and has a food safety certification for dry/non-fatty foods. The new material is now available to order across Europe. ■

Colours from Mondi's Pergraphica portfolio (Credit: Studio Beryll)

Ulano's Donald Marsden died in August

Obituary: Ulano director Donald Marsden

Donald A. Marsden, Director of International Commercial Services at Ulano Corporation, died on 20 August, aged 78.

Marsden joined Ulano in 1972 and received technical training in screen printing at the company's laboratories in New York and Zürich. He was involved in technical writing, training, and service; package design; product development and management; advertising and promotional writing; sales and marketing; forecasting, market analysis, and strategic planning.

As Director of International Commercial Services and a member of Ulano's Executive Committee, Marsden visited screen printers and conducted seminars across the globe.

An ASDPT board member, Marsden was inducted into the then Academy of Screen Printing Technology of SGIA in 1980. In 1990 he was invited to address one of China's first international symposiums on screen printing technology. ■

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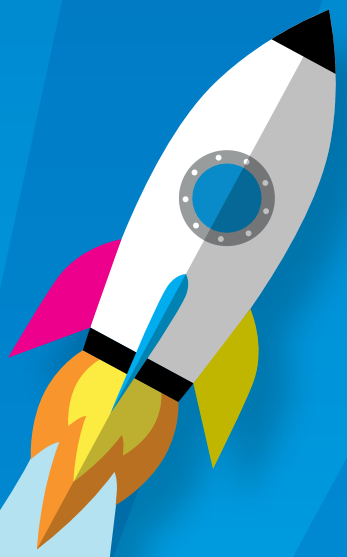

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