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2015

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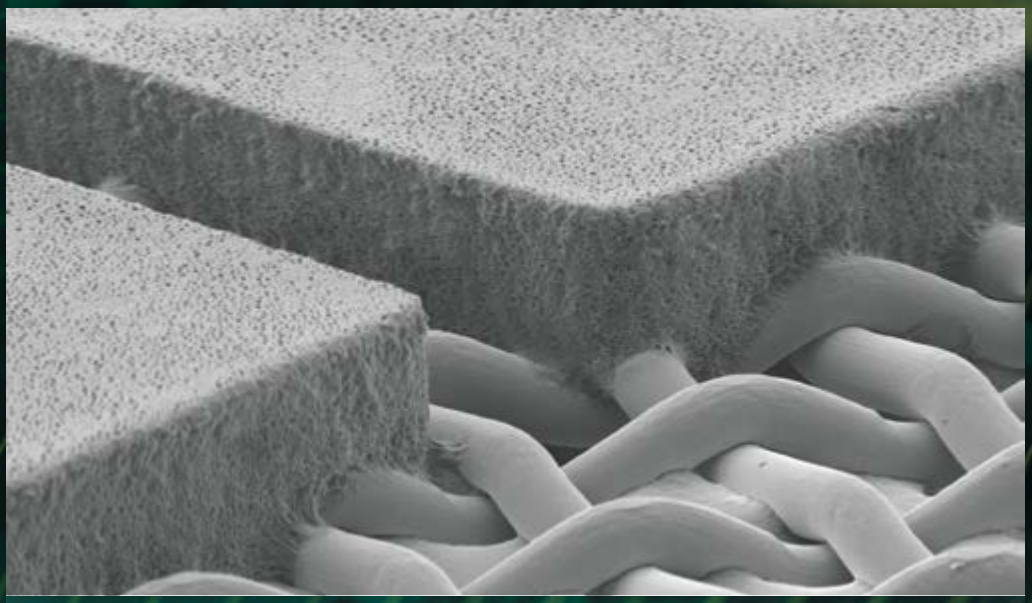

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WELCOME

Bryan Collings

A warm welcome to our global readership and I am sure you will find the educational content in the following pages useful to your businesses, wherever you are in the world.

As *Specialist Printing Worldwide* approaches its ninth year of publication, a key factor in the magazine's success has been the ability to provide a technical reference source to a worldwide audience, while at the same time providing a platform for regional coverage. Although we regularly work today in a global marketplace, many of our readers and advertisers still have regional priorities, and our content and geographical coverage provides the best of both worlds.

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For anyone active in glass decoration or for those looking at the potential of this fast growing sector, GlassPrint 2015 in Düsseldorf in November will provide the very latest information on technology available. Limited delegate spaces remain – see page 41. Attendees can also take advantage of the Direct Container Print conference to be staged directly before GlassPrint by ESMA.

Finally, our German representative August-Wilhelm Rust will shortly be retiring, with Graham Lovell taking over his responsibilities. We're extremely grateful to August for his contribution over the years and wish him a very long and enjoyable retirement.

Bryan Collings, Publishing Director, Specialist Printing Worldwide

A CONTINUING UPWARD TREND

Sophie Matthews-Paul comments on the steady growth of functional print

The topic of industrial print continues to grow in dominance through the digital realm as products and techniques extend their reach into former analogue-only applications and, in some cases, combine to provide a blend of technologies. While conventional processes are certainly not going to be superseded by latter-day methodologies, it's abundantly clear that fabrication and marking alike are now creating new opportunities and removing former boundaries in practical terms.

In the graphic arts sector we saw a typical pattern emerge relating to the progress of wide-format digital print. Initial surges every time a new technology gained hold tended to level off following a steady climb in interest and adoption, often dipping slightly before rising again. These trends were driven by the arrival of developments such as new or revised ink formulations, print-head improvements, the ability to print direct to rigid materials and changing market opportunities for would-be and existing users.

Whether or not functional print follows the same upward pattern remains to be seen but, from where I'm sitting, many of the overall developments that took years to bring to practical fruition in the wide-format and graphics segments will require a shorter progress curve in the industrial segment. The inks, fluids and print-heads of today are very different beasts to those of yesteryear, and their capabilities are already acknowledged as being well beyond merely providing a decorative appearance. Where the emphasis might have been on colour accuracy, droplet quality and durability for displays and signs, the sets of parameters tend to be more varied with a different emphasis in industrial production environments. Additionally, despite the overlap with graphics in some market areas, such as labelling and packaging, a key differentiator is the importance of integration of print and the role it has to play. This is particularly evident where specialist applications are required or in situations where the production process forms part of an overall manufacturing line.

NO SEA CHANGE

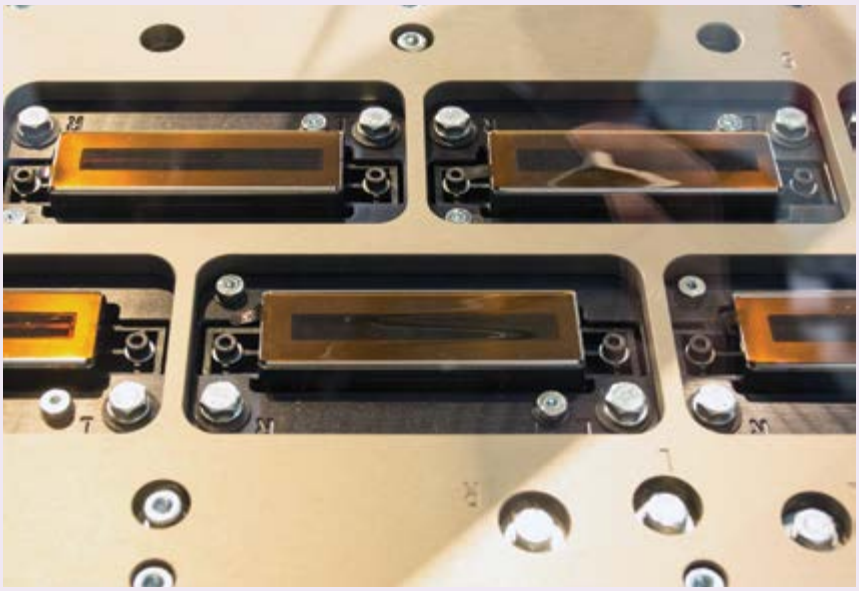
In common with the graphic arts and display sectors, industrial print is unlikely to be part of a sea change or, even, be privy to a significant quantum shift from analogue to digital. Part of the reasoning behind this lies in the technologies that need to be developed and fine-tuned; but a significant area is dependent on manufacturing principles and the markets to which they apply. Yet, regardless of production type, the final relevance for the end customer more than likely won't be focused on manufacturing procedures – as is true with the wide-format market, the true interest lies in whether an order is produced on time, priced competitively and performs as intended, be this for functional purpose, decoration or both.

However, unlike the display arena in the early days of wide-format engines, there is a new set of principles to bring into play when considering the digital advantages of functional production. In industries where waste is rife, such as the analogue textile segment's excessive water usage, there are no easily achievable short-cuts unless a move to digital is considered and accommodated. This transition also brings with it a host of other benefits, not least the ability to use the print-on-demand model and, of course, to address the just-in-time ethos that is so endemic in a world which wants to order goods with ever shorter turnaround times. Both of these principles juxtapose with the reluctance to run into over ordering and the holding of excess stocks, whether these are of finished products or printed components.

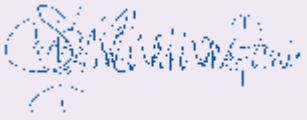
EFFICIENT LOGISTICS

Likewise, factoring in more efficient logistics and the never-ending drive for shorter lead times and faster deliveries is proving to be ever more relevant. Additionally, as already witnessed universally with textiles and ceramics, these factors tie in with the desirability and practicalities of mass customisation which also generate swifter processing from design through to finished product.

From now until the end of the year industrial print is taking centre stage with tailored conferences, now growing significantly in popularity, and InPrint's second edition looking to boost this side of the digital market. Functional production using digital technology is no longer a process in its infancy but, increasingly, has become a valuable and practical asset to the world of manufacture.



Today's print-heads are designed to perform well in both graphics and industrial environments



Sophie Matthews-Paul is an independent analyst and editorial consultant to Specialist Printing Worldwide

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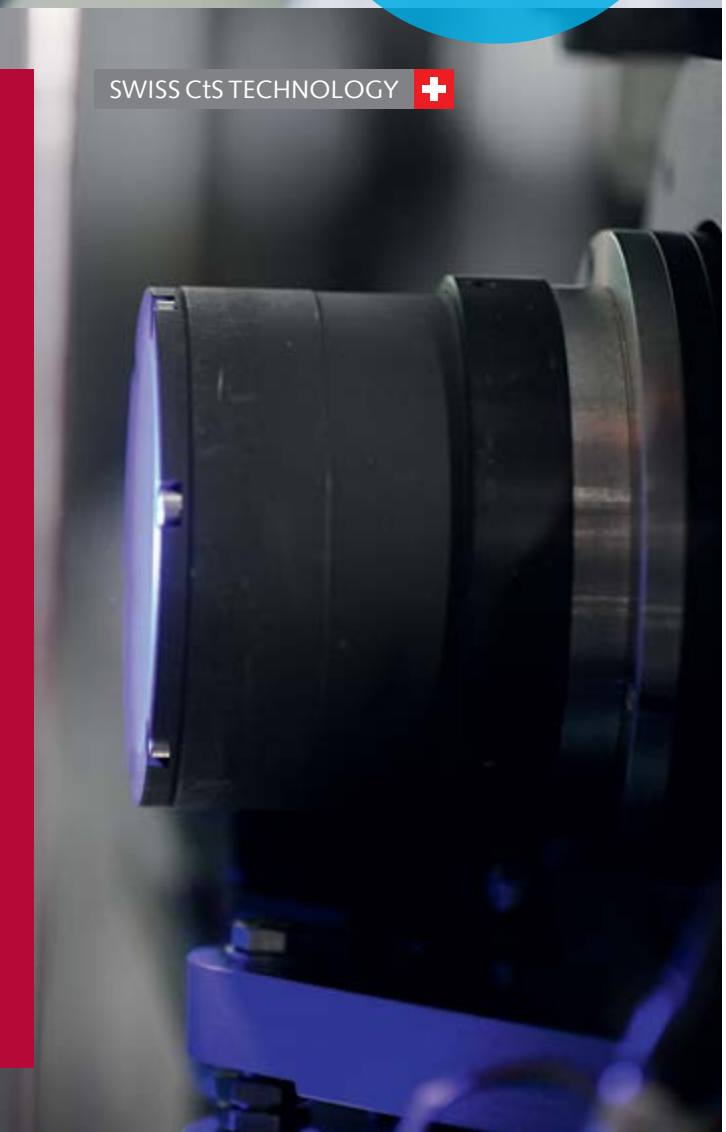

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CHALLENGE OF FINE LINE SCREEN-PRINTING FOR PRINTABLE ELECTRONICS

Hiroki Sano discusses why proper wire mesh must be selected for each printing project

Screen-printing remains the most cost effective method for producing a wide variety of electronic components. Modern electronic components often require conductive line width as fine as 50µm or even narrower. To screen-print such a fine conductive line, printers are required to utilise a mesh with the thinnest possible wire diameter which helps to minimise printing interferences and to control paste deposit.

However, as a wire diameter gets thinner, its strength diminishes and the weaving process becomes challenging. Leading wire mesh manufacturers who strive to develop wire meshes designed for fine line printing must use higher strength material. Moreover in applications such as LTCC, capacitors and inductors which require dimensional accuracy and stability, a high Young's modulus wire is vital. Table A shows specific wire meshes designed for fine line printing applications introduced by NBC Meshtec Inc, Japan. The strength and Young's modulus of the wire increases as you move down Table A (below). Fig A shows a comparison of physical property between three different wire meshes for reference.

It is important that the proper wire mesh be selected for each printing project. Careful consideration should be given to the priority of the technical printing requirements in each project as the print is greatly influenced by the selected mesh count, thickness, percentage of open area, strength, dimensional accuracy and so forth.

Calendered wire mesh (a process where the mesh is flattened by passing between rollers under high pressure) is a typical option to improve the mesh performance in several ways:

Continued over

Type	Material	Strength (N/mm2)	Mesh Count per inch	Wire Diameter (µm)
M12 M13	High Strength Stainless Steel	1200 - 1300	730	13
			640	15
			500	18
M30	Super Strength Stainless Steel	3000 - 3200	290	20
			325	18
			360	16
W40	Tungsten	4000	290	20
			325	16
			430	13

Table A: NBC Meshtec Inc's Metal Series

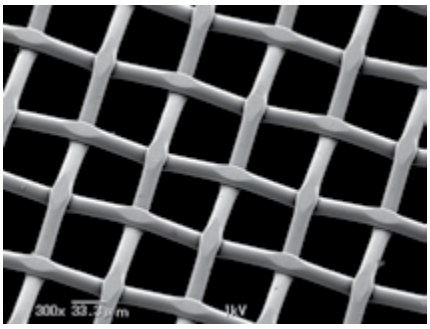

Photo A: M30 360-16µm Calendered Mesh

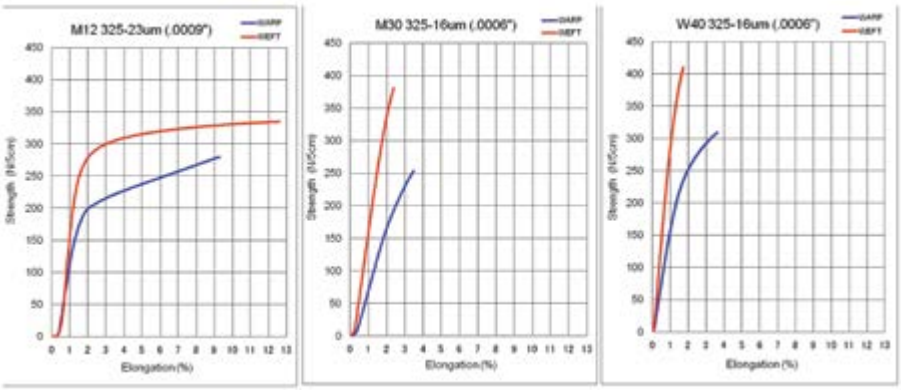

Fig A: Comparison of three different wire meshes

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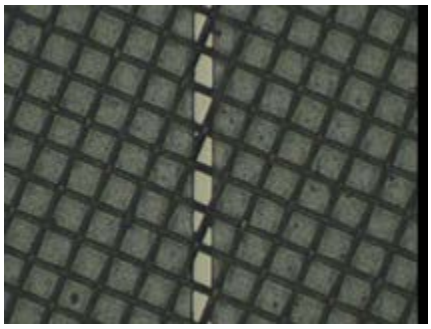

Photo B: Line width on screen 40µm

Photo C: Print output line width 44.6µm

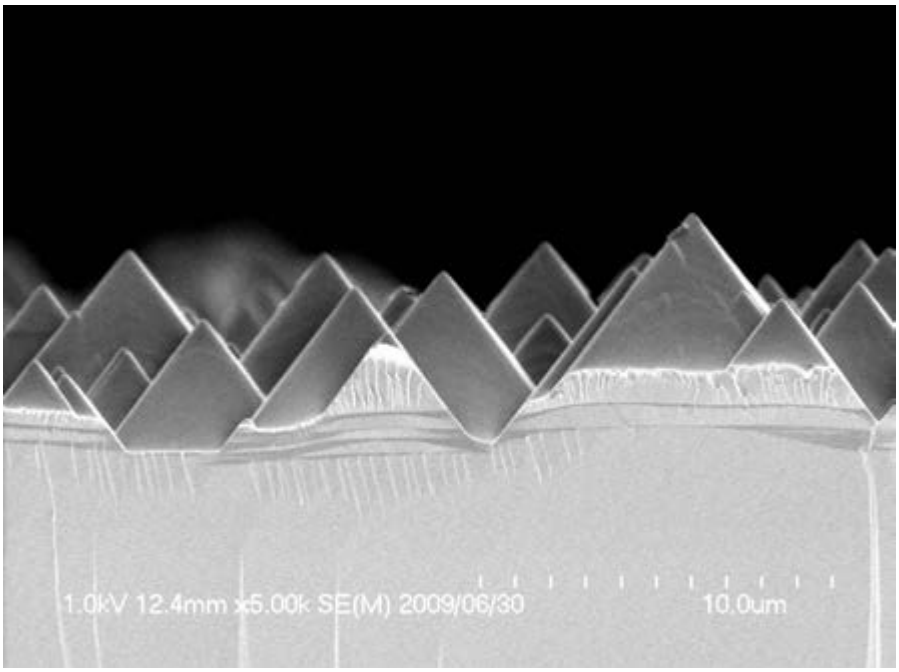

Photo E: Solar cell substrate cross-section – x5000 90 degree angle

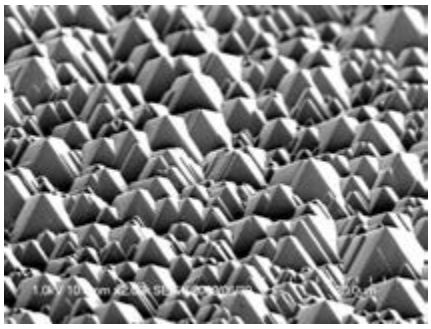

Photo D: Solar cell substrate surface – x2000 40 degree angle

- The knuckles of the warp and weft wires are fastened tight and the mesh structure is stabilised to improve dimensional accuracy.
- The thinner the mesh, the lower the screen thickness, leading to a thinner paste deposit.
- The flattened knuckles of warp and weft wires improve the surface smoothness of the mesh, helping to improve screen Rz value, ultimately leading to better print resolution.
- It improves the thickness consistency of the mesh to +/-1µm (vs. +/-2µm with non-calendered mesh), thus resulting in a more even stencil and even print.

This precision process can be applied to all wire meshes featured above. For instance, it is possible to calender a wire mesh's total thickness down to the thickness of the individual wire diameter + 2µm. So for instance M30 360-16µm show in Photo A can be calendered down to total mesh thickness of 18µm.

1. SOLAR CELLS (ELECTRODES)

One well-known printable electronics application is photovoltaic/solar cell.

Line straightness and uniform paste deposit are essential for printing solar cell surface electrodes. In order to optimise the electrical performance of the solar cell, the goal is to maximize the light receiving area on the surface of the cell while, at the same time, deposit enough paste for proper resistivity. The industry trend has been moving towards ever narrower/tall lines. To achieve such printed lines, some solar cell manufacturers have been using a double-print process. This is a process where two screens are used in succession in a print-on-print technique in order to build up the height of the printed line while keeping it narrow. Needless to say, this double-print process requires critical dimensional accuracy and repeatability from both the screen and the printing machine.

Most pastes used for printing on solar cells have a relatively high viscosity. Furthermore, squeegee speeds for solar printing are typically running at a rate of about 200mm/second. Consequently, a screen mesh with a small wire diameter and high open area (40%+) is generally required. The most recommended meshes for such applications are M30 290-20µm or M30 360-16µm. Photo B and C below feature a screen and printed line using M30 360-16µm mesh.

The surface of the silicon wafer, pictured in Photo D and E displays an irregularity referred to as 'texture'. Printing on such surface with variations of up to 15µm is considerably more difficult than printing on a

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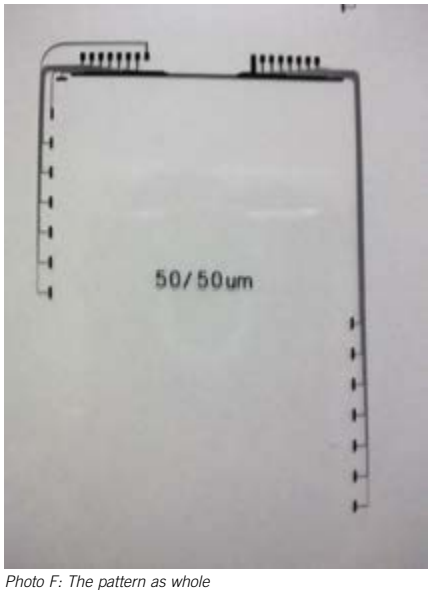

Photo F: The pattern as whole

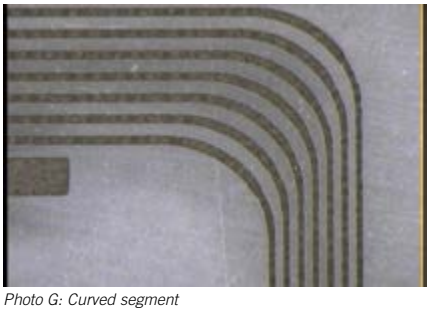

Photo G: Curved segment

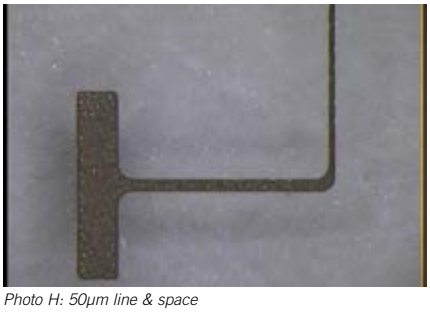

Photo H: 50µm line & space

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Photo I: 15µm line & 30µm space

smooth surface, as the rougher the texture, the greater the challenge.

For this type of printing, screens require a softer, high resolution emulsion with an increased thickness of about 15 to 20µm to help improve the gasket effect between the screen and the solar cell substrate.

Where finer lines are required, a screen mesh with even finer wire and a substrate with a smoother 'texture' are needed.

2. TOUCH PANEL (FRAME EXTRACTING ELECTRODES)

Oftentimes, untreated PET films, glasses or ITO films are used as printing substrates. Paste spreading can easily occur during printing with these types of hydrophilic materials. Because of that, the paste needs to be extremely high in both viscosity and thixotrophy. The typical printed line widths are 70µm or even narrower these days; consequently, a wire mesh with a mesh count of 400 tpi (threads per inch) or higher and with a wire diameter 20µm or thinner is highly recommended in order to optimise the paste deposit.

Photo F features enlarged images of 50µm lines printed on untreated PET film using M12 500-19µm mesh. The most critical spots to print are the curved lines shown in Photo G and the single fine line shown in Photo H. Curved lines are prone to smearing and single lines tend to break or disconnect. In a mass production setting, screen clogging is an issue with high viscosity paste.

3. LTCC ELECTRODE PRINTING

Photo I shows 15µm line and 30µm space printing for an LTCC application. The substrate is a type of ceramic material referred to as 'green sheet'.

This porous material absorbs the paste solvent at the time of printing, minimising spreading and making it possible to print extremely fine lines.

4. SCREEN-PRINTING FINER LINES

To screen-print 30µm or finer line, below are important parameters to know:

- Choose a mesh count of 500 tpi or higher with a wire diameter 20µm or thinner.
- Select a high resolution emulsion with photopolymer size of less than 2 microns.
- Go with a glass mask (preferably chromium coated) for your artwork.
- Use a parallel light or Fresnel lens exposure unit for imaging.
- Opt for a precision printer with a suitable printing pressure that doesn't exert too much load (squeegee pressure) on the screen (guideline of squeegee pressure is typically about 0.2 to 0.5N/cm).
- Operate in a consistent environment (temperature and humidity controlled) for both screen-making and the printing process.
- When possible prepare/treat the surface of the substrate to minimise ink/paste spreading.

Photo J shows one of the new prototype screens with 10µm lines and 20µm spaces using M12 730-13µm mesh and a 5µm EOM (Emulsion Over Mesh) to meet further technical requirements.

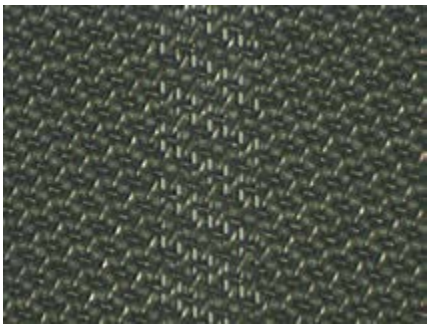

Photo J: 10µm line on screen

To reach the level of screen-printing shown above requires not only the combination of the finest materials, but also technical know-how. Screen-printing industry leaders (various manufacturers of mesh, emulsion, ink/paste, equipment, substrates etc) continue to invest heavily in R&D in order to provide new products and technologies that push the limits of screen-printing. Skilled consultants and technical experts work tirelessly to combine these advanced materials, thus improving on current applications and widening possibilities for printable electronics. We hope this article helps to point out some of the technical challenges faced by screen-printers, while also encouraging them to continue to move forward. We are honoured to support our industry both with our products and with our technical services. ■

Hiroki Sano works in the Screen Printing Lab at NBC Meshtec

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LEADING IN LIGHT SENSITIVE TECHNOLOGY

Yuliya Finkel gives an overview on developments in direct emulsions

Direct emulsions have been used for screen-printing for nearly 50 years and have become increasingly sophisticated because of advancements in the chemical industry, especially polymer chemistry and light-sensitive systems.

What started as bichromate-sensitised, water-based adhesives (glues) and gelatin-based indirect system stencil films, have evolved into specialised, high performance, coatings that are used in the screen-printing of LCD screens, flexible circuits, solar panels and other high precision manufactured items.

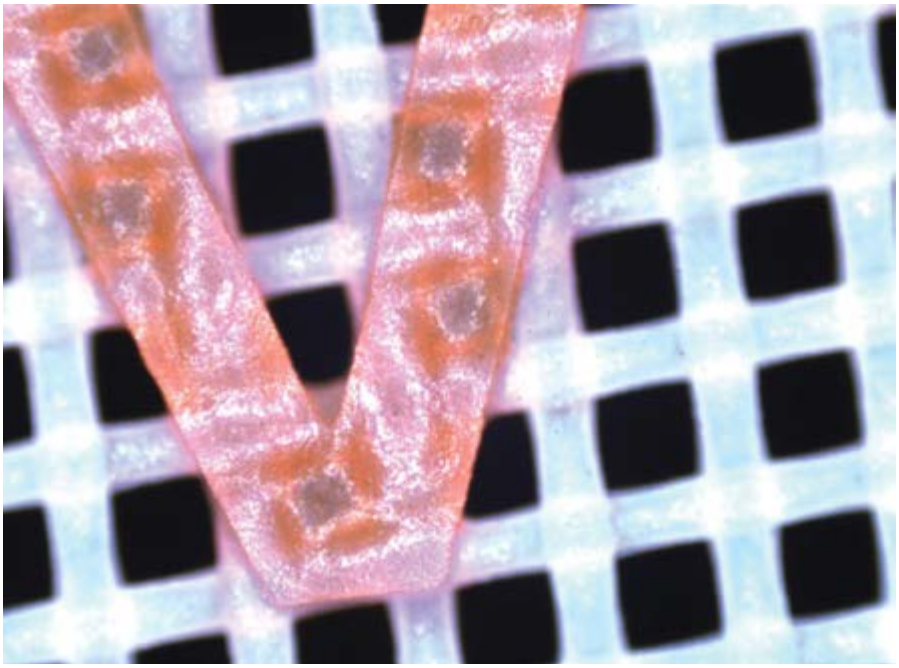
In the mid 1960s, Ulano released indirect system, gelatin-based films that did not require bichromate sensitisation. They were 'presensitised,' utilising iron salts and requiring an oxidation-reduction developing step using hydrogen peroxide. In the mid 1970s, led by Ulano, environmentally-conscious companies replaced bichromates (discovered to be carcinogenic) in direct emulsions with the light-sensitive dye that became known in the industry as diazo. Far safer to handle than bichromates, diazo offered the additional advantages of extended storage, pot and shelf life, and in some cases greater exposure latitude.

With the introduction of diazo, emulsions become more specialised, with two distinct categories becoming available – those that had high water resistance and those that had high solvent resistance. Two Ulano products became staples of the industry – 569 offered total solvent resistance and reclaimability while TZ (later superseded by 925WR) became a work-horse product for printing water-based inks, and was also reclaimable.

BREAKTHROUGHS IN THE EIGHTIES

The 1980s saw two major breakthroughs in emulsion technology. The first was associated with development of stilbazolium quartenary (SBQ) salt, an innovative, very efficient sensitiser for use with direct emulsion polymers. SBQ provided extremely fast exposure times, allowing the successful utilisation of low intensity, non-industry-specific light sources by smaller shops, and the increasing use of projection cameras for large format graphics.

SBQ-based pre-sensitised emulsions lacked water resistance and offered limited solvent resistance as well. Nevertheless, SBQ quickly became the stencil technology for plastisol printing. Ulano's QTX consequently become the product of choice for many textile printers worldwide.



Ulano's Orange emulsion stencil swiftly became a best-seller

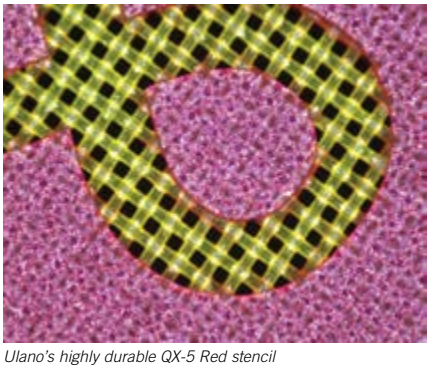
Ulano continues to develop emulsions in this category, further enhancing the performance of SBQ-based emulsions. CTS-FAST was introduced in early 2010. Like QTX, CTS-FAST became a product of choice for scanning, low intensity computer-to-screen light sources.

Innovative anti-halation technology, developed at Ulano, brought further advantages to the SBQ-based product category; with ORANGE textile emulsion becoming Ulano's best-selling product within two years of its introduction in 2012.

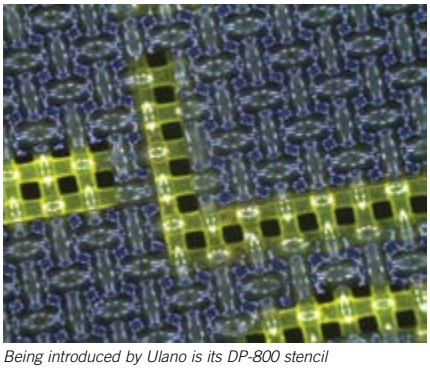
The second break-through in the eighties came with the commercial availability of light-sensitive acrylic resins.

The incorporation of acrylates allowed the creation of so called 'dual-cure' emulsions, in which the acrylate resin phase of the emulsion is already pre-sensitised. Added at the point of use, diazo is still responsible for sensitising the water-soluble phase of the emulsion. Dual-cure, or diazo-photopolymer, emulsion technology allowed the development of more universal, higher resolving, more durable, better imaging products that often afford equal resistance to water-based and solvent-based inks.

RLX was one of Ulano's first dual-cure products and within three years of introduction, its production reached 182 metric tons (400,000 pounds) a year. Subsequently, more specialised Ulano dual-cures – high solvent resistance Proclaim and LX-660 with its matte surface and high humidity resistance – became well-known and commercially successful products.



Ulano's highly durable QX-5 Red stencil



Being introduced by Ulano is its DP-800 stencil

NO HARDENER REQUIRED

The newest product at Ulano in this category is Double-Duty emulsion. The exceptional water resistance of this emulsion allows it to be used without a hardener, yet it offers excellent reclaiming properties, along with good resistance to water-based and discharge inks. It also has superb mechanical durability and resists very acidic media.

For a decade, the choice still had to be made between limited resistance, fast SBQ-based products, or the better copying, more versatile dual-cure products that required sensitising at the point of use.

SBQ-DUAL CURES: HYBRID EMULSION

The next breakthrough in the labs came in the late 1990s and early 2000s when advances by Ulano R&D made it possible to combine both SBQ and dual-cure photochemistry in 'hybrid' technology, introduced by Ulano in its QX-1 emulsion. Hybrid emulsions are dual-cure emulsions that use SBQ instead of diazo. The longer pot life of SBQ allows the hybrids to be pre-mixed; they are pre-sensitised and ready-to-use.

The introduction of hybrid technologies alleviated many of the limitations of SBQ technology. Though slower to expose than SBQs, hybrids offer solvent resistance suitable for the graphic arts market. Exposure speed still remains fairly fast, so that hybrid emulsions can be used in textile printing shops with low-intensity light sources or the need for rapid stencil throughput.

Hybrid emulsions at Ulano have proliferated over the years, now including the very versatile QX-5 series, which has an excellent track record with new UV-LED light scanning units.

The newly introduced fast-exposing Platinum emulsion for the textile market offers very short exposure (generally not characteristic of the hybrids), with the excellent durability of hybrids, and also features easy decoating.

A new product series is EC-Cure Emulsion. Two years ago advancements in the photo-chemical technology of presensitising emulsion allowed Ulano to introduce another group of screen-printing products – the 'EC' or EPIC-Cure emulsions. These EPIC-Cure emulsions, utilising RD-sensitising technology, resemble dual-cure performance, with solvent and humidity resistance comparable to that of universal dual-cures. EC products, which are presensitised, do not require sensitising at the point of use and offer most of the favourable properties of dual-cure emulsions.

EPIC-Cure (EC) emulsions have a light sensitivity similar to SBQ-sensitised products; however, their response to light is much more precisely controlled, facilitating much better cross-linking density, copying, and resistance properties than those normally associated with SBQ-sensitised emulsions. Ulano has introduced to the market the first product of this series, Proclaim-EC, and is in the process of introducing another (now called DP-800).

Ulano has received very positive responses from the first users of EC products, commenting on how easy the process is for the stencil maker by eliminating sensitising and degassing time, and simplifying the product and process for the stencil maker. Moreover, with EC-technology, the usual problems of SBQ sensitised products – often fuzzy edges due to their very small exposure window, lower cross-linking density and associated limited resistance – are gone as well. RD-sensitising technology has, once again, allowed Ulano to create easier-to-use and better performing products. ■

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THE BENEFITS OF HIGH-END PHOTOEMULSIONS

Katrin Oehrle describes their use in specialist screen-printing applications

A dual-cure diazo high-end photoemulsion for printing line widths under 30 microns, Azocol Z 170 FL is specifically for use in the solar industry and for printed electronics. Within the field of printed electronics, there are numerous applications in which the screen-printing process is used. These include, for example, OLEDs, touch panels and displays; in this context, we can also include LTCC (low temperature co-fired ceramics), MLCC (multi-layer ceramic capacitors) as well as fuel cells. At the present time, 20 microns and less can already be screen-printed effectively.

The production of solar cells (both mono and multi-crystalline cells) highlights another field, in which ever thinner but, at the same time, higher fingers of conductive silver are required. In this way, high performance cross-sections and very low light-blocking can be achieved on the silicon wafers. Screen-printing has already proved that 30µm fine lines can be laid down as standard.

To achieve such high degrees of resolution, the combination of a number of parameters is a prerequisite. One of these is a suitable photoemulsion. In developing Azocol Z 170 FL, a high-end photoemulsion, KIWO – Kissel + Wolf GmbH has launched a product ideal for applications, when both highest resolution and edge definition are required, even at higher EOM build-ups.

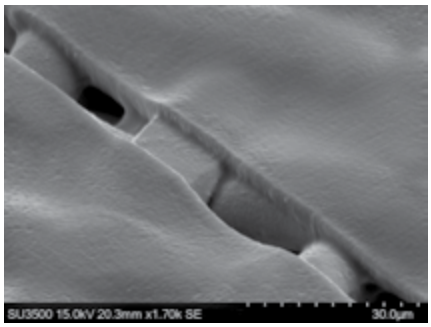
FL stands for FineLine, which indicates line widths of 30 µm and less. In this range of micro-sizes, it is possible to achieve this kind of fineness with Azocol Z 170 FL without any problems.

This is attained on the one hand through the finest particle dispersion of the emulsion and, on the other, the ability of the photoemulsion to absorb ultraviolet light reflection so well during exposure that light-scatter effects are largely avoided.

Furthermore, the emulsion has excellent paste release, obviating any 'bleeding effect' in the printed image and additionally, the solar paste is almost entirely released during printing. In the production of solar cells this, in turn, leads to printed lines having a higher aspect ratio and saving both silver paste and thus reducing costs.

In addition to the demand for excellent resolution, the reproducibility of the printed image is of vital importance. All previous print characteristics can be precisely reenacted with Azocol Z 170 FL. This has a high relevance for example, when double-printing on silicon wafers.

Every stencil has to undergo cleaning, not only when the print cycle is finished, but also at times during the printing process itself. As Azocol Z 170 FL is both water- and solvent-resistant, all conventional cleaning agents and speciality solvents such as NMP and NEP can also be used.



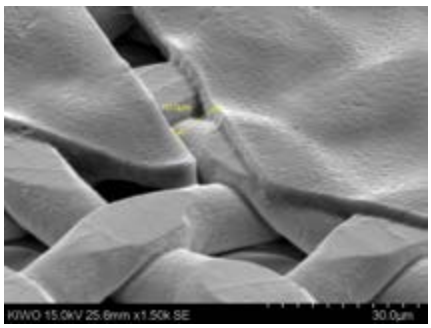


Figure 1: Azocol Z 170 FL on 730-013 metal mesh, EOM 3 µm, Rz 3.8 microns, 10 µm line

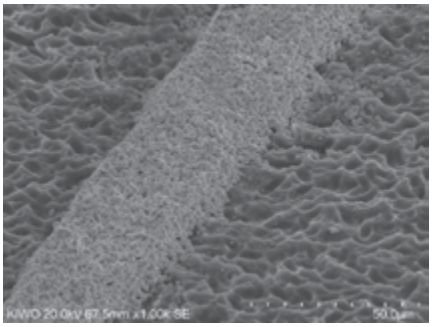
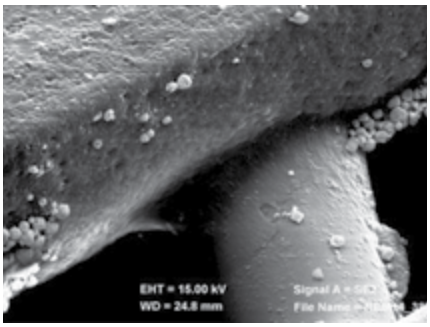


Figure 2: Azocol 170 FL, 25 µm line printed on multi-crystalline silicon wafers – imaged with a light microscope (top) and scanning electron microscope



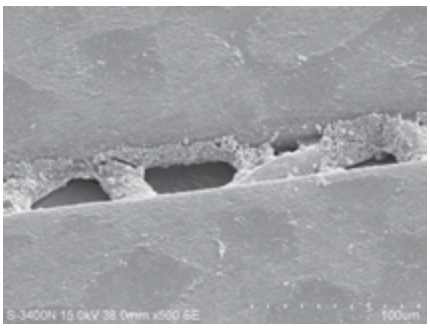


Figure 3: Difference between bad (top) and good past release

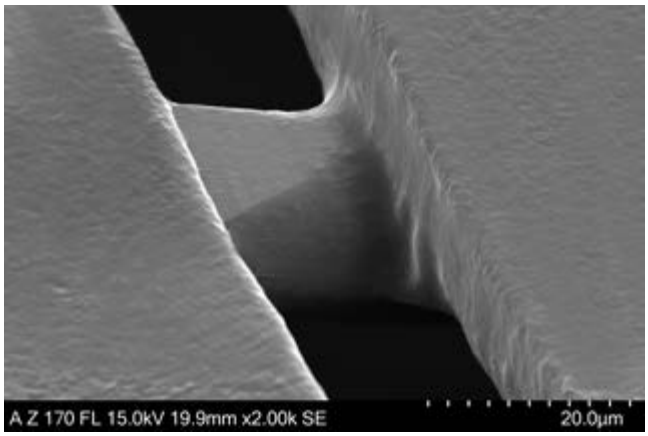


Figure 4: Azocol Z 170 FL on 400-018 special mesh, EOM 13 µm, Rz 3 µm, 20 µm line

Depending on the application and in order to obtain the best possible performance of the photoemulsion, it is imperative to use high-quality stainless steel mesh and exposing films or chromium masks. In these combinations, excellent results can also be achieved at relatively high EOM build-ups of 10-15 µm.

KIWO is attending Productronica 2015 in Munich where more information will be available about these products. The company's multilingual team of experts will in Hall A3, booth 121. ■

Katrin Oehrle works in the Applications Lab at Kissel + Wolf

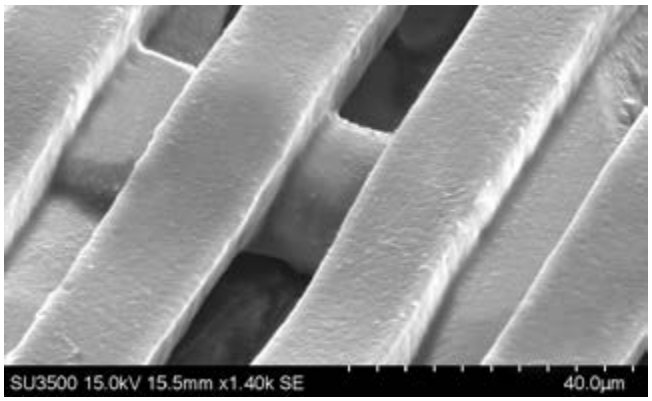


Figure 5: Azocol Z 170 FL on 400-018 metal mesh, EOM 11 µm, Rz 3.3 µm, 15 µm line

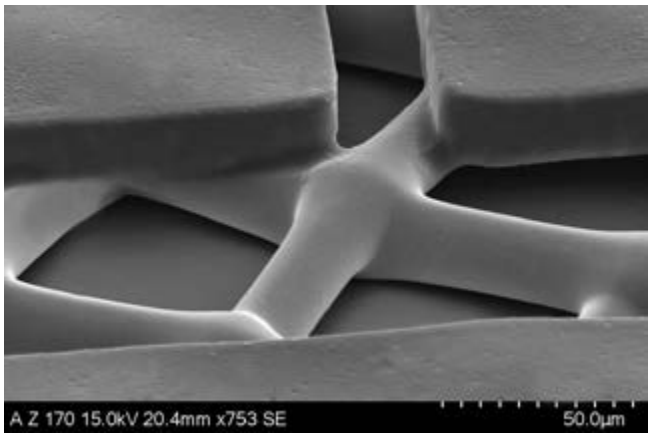


Figure 6: Azocol Z 170 FL on 400-018 metal mesh; EOM 13 µm, Rz 3 µm, 20 µm line (magnification: 2000x)

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LASER PLATE-MAKING FOR PAD PRINTING

Benjamin Adner discusses the options available in today's market

Benjamin Adner

In the USA during the past ten years laser plate-making has made great strides in the pad printing industry, helping large and small companies improve their production. The reason is that making plates with a laser provides major time-savings, better-quality images, consistent depths and is much easier to run on the production floor than the traditional process of exposing and chemically developing photopolymer plates. We – Inkcups Now Corporation – can attest to that, having converted most of the largest pad printing companies in the USA to this technology, installed hundreds of laser plate-makers for more than eight years, and seen customers benefit time and again.

However, other regions of the globe have not readily utilised this excellent technology, especially Europe, which surprisingly has been behind the adoption curve. Now is the time to take advantage of laser plate-making for pad printing – especially since there are new machines to meet any production needs and any budgets. I believe it a great time to give laser plate-making options another look – the global revolution really starts now.

TYPES OF PLATE-MAKING LASERS

There are three categories of laser plate-makers, each using a particular type of plate material. Every category has particular features, benefits and price points, and I would like to run through them to help the user choose which machine is best for them.

The three categories of laser plate-makers are YAG lasers (also known as fibre lasers), CO_2 lasers, and a brand-new category that Inkcups Now developed that is founded in our Cobalt 2000, which we call WFC technology. YAG/fibre lasers are generally good for metallic and inorganic materials, whereas the CO_2 and WFC lasers are good for organic materials such as plastics and various coatings.

FIBRE LASERS – HEAVY-DUTY

When making pad printing plates with a fibre laser, you get very good detail due to their very small spot size and exceptional depth control resulting from excellent beam quality and consistency. Fibre laser plate-makers are typically very reliable due to the quality of the laser, quality of components used and lack of parts that wear. For example, the fibre laser source is rated to operate for up to 100,000 hours of etching. The laser beam is fired into a scan head and directed with mirrors and, therefore, is very fast and very good for straight lines.

Fibre lasers generally tend to be more expensive because of their industrial construction and cost of high-quality components, including the laser source, scan head, control card, software and industrial cabinets. These fibre laser plate-makers are geared towards a high-volume production user and have sell prices ranging from $25,000 to $40,000.

The fibre lasers have the advantage of being able to engrave metal; therefore the plates that are used with these machines have a metallic surface which is very hard, smooth and durable, and affords etching with a very accurate depth and a very crisp edge. They doctor well and are typically very easy to work with on the production floor. The plates are offered in two different types –

Continued over

The Cobalt 2000 laser plater-maker

Etched Cobalt laser plates

Etching the Inkcups Now logo using the Cobalt 1000 YAG laser

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Well-formed round dots (raster) in bold logo, shown under a microscope

double-sided and single-sided and are normally good for up to 80,000 impressions (40,000 per side). The single-sided plates are backed with steel – for use with magnetic pad printers; however, only one side can be engraved.

A word of caution – over the years, we've seen a number of pad printing facilities trying to adopt various inexpensive plates not designed for laser plate-making. These plates never perform well, have limited production life and don't etch cleanly especially with fine line and bold logos, when the plates get dented during the etching process. Moreover, the coating usually does not have consistent thickness, is very thin and wears quickly. The coating on the second side is even thinner and not suitable for pad printing at all. The whole endeavour ends up costing more time and money than buying proper material designed specifically for pad printing.

CO2 LASERS – CHALLENGES AND BREAKTHROUGHS

The next category is CO_2 laser plate-makers. In general, a CO_2 laser plate-maker can make excellent quality plates and the best bold logos of all the laser types due to the fact in can make nice round dots for the dot pattern (raster) in the etch. However, they are by far the most difficult to tweak, control and keep consistent. Any changes in the laser power, wear in the bearings or debris on the slides will cause a deterioration of image quality, inability to make a bold logo and banding in the image. (Banding manifests itself as stripes in the image.)

To make good plates, a CO_2 laser must have a very high quality tube with consistent power, excellent power control with a low-power tube (5-10 Watts maximum) and proper etch settings dialled in for various logo types. The litmus test of quality CO_2 laser plate-maker is the ability to make a good, round dot and a bold logo that will not scoop (no light spots during printing).

Over the years, people in the pad printing industry have been trying to adapt cutting lasers from companies like Universal, Epilog, GCC and many others. These are terrific cutters but they don't have the controls that you need to consistently make pad printing plates. (We've tried them all.) Although the machines work and can make a pad printing plate with simple graphics such as text, most people have difficulty with them – because you need a high-precision tool to make a great pad printing plate.

Making a laser plate is one of the most difficult laser applications. We are talking about an etch depth of 1/1000 of an inch, or 25 microns, with a dot pattern (raster) with perfectly round dots within the etch to make a good-looking print. This is why we felt it necessary to design a dedicated plate-making laser such as the Cobalt 3000 specifically for this difficult application. It features lower power, a highly controlled motor speed, rigid head bearings, excellent control software and a low selling price.

The cost of CO_2 laser plate-making machines ranges from $11,000 to $20,000. Our Cobalt 3000 is one of the least expensive because we took out such unnecessary features as height-adjust mechanism, which is needed for cutting but not for plate-making, and went with a lower-power laser, which is better for plate-making but not for cutting. In this case, lower cost comes with higher quality – all the lasers we offer are proudly designed and built in USA, by or in-house engineers and technicians.

Plate materials typically used for CO_2 lasers are hardened polymer plates of various types and sizes. These generally work well but can be very inconsistent due to the fact they are not designed for the application, can vary in hardness due to inconsistent curing and the fact the plates become soft in heat and humidity. Inkcups Now has designed two speciality materials specifically for the CO_2 wavelength – AccuLaze, which is a double-sided plate material typically used for small and medium size logos and CrystaLaze, which is a single-sided plate ideal for all image types.

ALTERNATIVE-POWER LASERS – AFFORDABLE TO ALL

The third category of laser plate-makers is brand-new and is found in our Cobalt 2000 laser, which has an alternative laser source we call WFC technology. These lasers are specifically designed to etch only pad printing plates and feature a laser source that is low-cost and has a very small spot size. As a result the Cobalt 2000 can etch quality images for general pad printing as well as four-color process images and other types of logos that require a high level of detail.

The Cobalt 2000 laser is affordable to all and sells for roughly $6,000, which may make sense even for someone who has only one pad printer and does not want the hassle of making photopolymer plates. It is worth noting that, due to the very small spot size, the Cobalt 2000 does not engrave plates as fast as the other technologies and is about 20% slower. A plate that would take five minutes on a YAG or CO_2 machine, would take approximately six to seven minutes on the WFC laser.

There are two types of plate materials used with the Cobalt 2000 – double-sided AccuLaze plates, which are fixed-depth so you get a consistent depth every time and up to four images per plate, and Onyx plates that are single-sided plates and enable variable depth control.

IMPORTANCE OF EXPERT SUPPORT

The type of laser you buy is generally dictated by the number of pad printers you have. If you use more than ten machines in a heavy production setting, you should be thinking about the industrial fibre laser plate-makers. If you have fewer than ten machines, probably CO_2 makes sense. Below five pad printers, the WFC lasers would be the choice. In short, regardless of how many pad printers you operate, there is a laser-to-plate combination for you that will simplify the pad printing process and make financial sense.

When considering upgrading to laser plate-making, it is important to look for resources like Inkcups Now – ones with experience and know-how. We pioneered laser plate-making in this industry, have shipped, successfully installed and supported more than 400 machines, and now are the innovators of two new revolutionary machines. We have learned that every installation is unique – every company runs its inks a little differently, runs its machines at different speeds and uses different shapes and durometer of pads. We understand all of these variables and can fine-tune every laser type to make a successful installation. Regardless of which laser you choose, the support that goes along with it makes all the difference. ■

Benjamin Adner is President of Inkcups Now Corporation

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ADVANCED SCREEN-PRINTING TECHNOLOGY AND ITS PHOTOPOLYMERS

Daisaku Adachi and Junichi Kawanobe discuss downsizing trends of the components used in electronics applications

Screen-printing technology in the modern age has shown rapid progress supporting the outstanding downsizing trend of the components used in electronics applications. Stencil quality gives the greatest impact to the quality of electric components of which electrode patterns are screen-printed, especially if these consist of very fine lines. This article introduces the latest trends of the most advanced stencil making techniques and the photopolymer material used for the pre-press process.

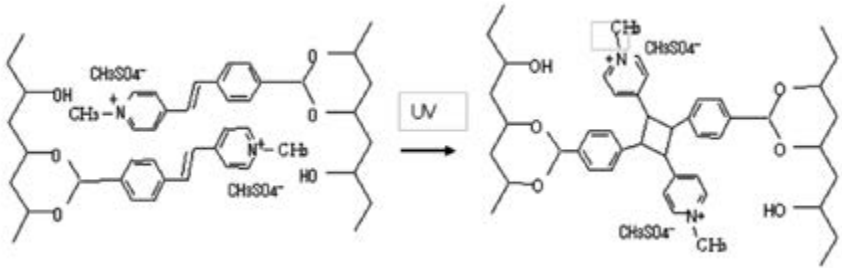

Figure 1: Photopolymer with PVA-SBQ

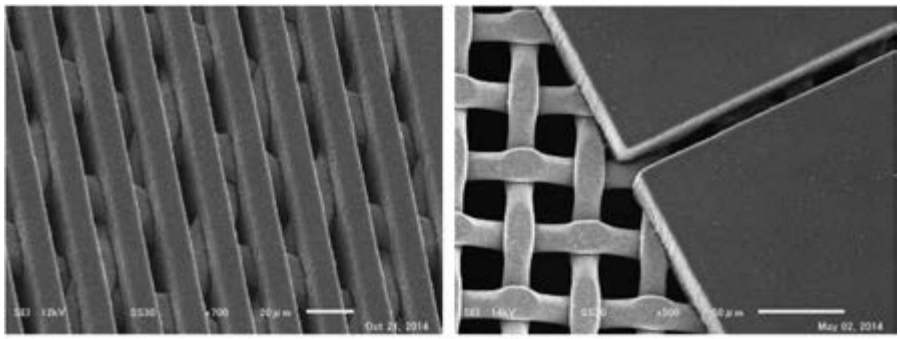

Figure 2: Cationic polymerisation based photo-sensitive resin

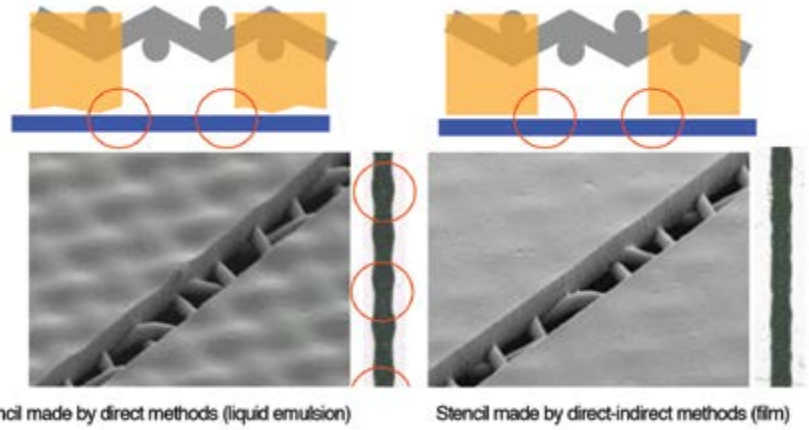

Figure 3: Comparison of direct method vs direct-indirect method

The upside of these screen-printing methods is not only the ability to print a relatively thick ink deposit compared to other patterning processes, such as a spattering method for instance, but also provides the 'second to none' cost efficiency that slashes the substantial investment on equipment and operating expenses. These are the reasons why screen-printing is said to have supported downsizing and high-density integration of the electric components in the past decades.

Remember that the finest lines screen-printed on electric components used to be around 30µm at lab scale and about 50µm in a volume production basis but currently some production is screen-printed in finer than 20µm wide lines. Just 'fine line' is not enough, needless to say, to produce consistent results. Flat and even printing, and reasonably fair linearity is required more than ever as the pattern gets more and more precise so that the printed conductive lines perform electrically.

You have to watch out for all complex parameters such as the metal paste, press settings and stencil preparation individually to repeatedly reproduce the same fine line print quality. We would now like to focus on the industrial trend of the most advanced stencil making technique:

1. PHOTOPOLYMER FOR SCREEN STENCIL APPLICATION

Neutral water washable and negative type photopolymers, which contain PVA as a binding polymer, have long been popularly used for the image reproduction of the screen stencils and the same kinds of photopolymer materials are still used today where people are more demanding than ever for high resolution power. Neutral water is used as the solvent of photopolymer and it is a great advantage for the industry to have such a non-VOC lithography solution

1) Potassium dichromate used to be popular in early times as a photo-sensitiser, but it has been gradually replaced by less hazardous diazonium salt formalin condensate of diphenylamine-4-diazonium salt. Years later, PVA-SBQ, which was a PVA compound with styrylpyridinium salt added for acetalisation, was newly developed

2) Figure 1 is the diagram to show how the cross-linking chemical reaction takes place. Photopolymer with PVA-SBQ, a new sensitiser, was a ready-to-use one-part type material with a shelf life that was drastically extended for much longer and was more sensitive to UV wavelengths resulting in an image which exposed much faster than conventional sensitisers. Furthermore, many more hardening processes of the photopolymer occurred, such as radical polymerisation of the acrylic monomer
3) Ionic bonding of the cation of PVA-SBQ to harden the photopolymer more solidly
4) Liquid-repellent photopolymer by using fluorine-based resin
5) And so forth have been additionally developed for screen stencil application depending on the various needs and demands from the screen printing shops.

2. TOP QUALITY PHOTOPOLYMER WITH ULTRA-HIGH RESOLUTION POWER

Negative-type photopolymer is popularly used for screen stencils and the biggest challenge to obtain the highest resolution power is: how can we can minimise photopolymer's swelling against water while the exposed image is developed by pressurised water? A 'cationic polymerisation based' emulsion is newly developed now to answer this scenario. This new photopolymer is extremely water resistant and its solvent resistance is fairly good too; it has been contributing to the industrial trend for fine line printing in the PE – Printable Electronics field. (Figure 2).

3. DIRECT-INDIRECT FILM

One of the mandatory processes in stencil making is to coat the photopolymer – the UV sensitive resin onto the woven mesh being stretched on the aluminium frame. The coating process of the liquid emulsion is called 'direct method', but this conventional coating process tends to create an uneven stencil surface with the peaks on the mesh knuckles and valleys on the mesh openings. Another method, which is called 'direct-indirect method', that is coating the photopolymer resin in liquid form onto the PET base film for dry transfer to the photopolymer layer to the stretched mesh, which results in a flat and even stencil surface.

Figure 3 typically shows the primary difference between the direct method and the direct-indirect method. It is extremely important to secure the flat and even stencil surface for the fine pattern printing since the uneven surface causes unwanted blur of the image after print. Also, the thickness of the direct-indirect film is very consistent and it helps to control the ink/paste deposit on the substrate easier.

4. MESH EVOLUTION

Extensive R&D efforts have been made on mesh improvement reflecting the various needs and wants for fine pattern reproductions. Screen mesh used for fine electrode pattern printing of electric components most likely consists of extremely fine stainless wires with thread diameters as fine as 11µm minimum at this time. Pin-pointing the solution of the unique problem(s) or challenge(s) in stencil making and/or screen-printing can be realised by extremely fine wire mesh with extra treatments added as introduced below.

4.1 Black screen

The shiny stainless mesh surface is chemically blackened so that the unwanted halation – UV reflection at random directions – would be minimised, and the resolution power and emulsion edge definition would be remarkably improved.

4.2 UCAL – ultra calendering process

The calendering process is used to flatten the woven mesh, especially at the knuckle parts where the warp and weft intersect at right angles. Mesh is not only used as the supporting base of the photopolymer stencil but also as the spacer that directly impacts to the printed ink/

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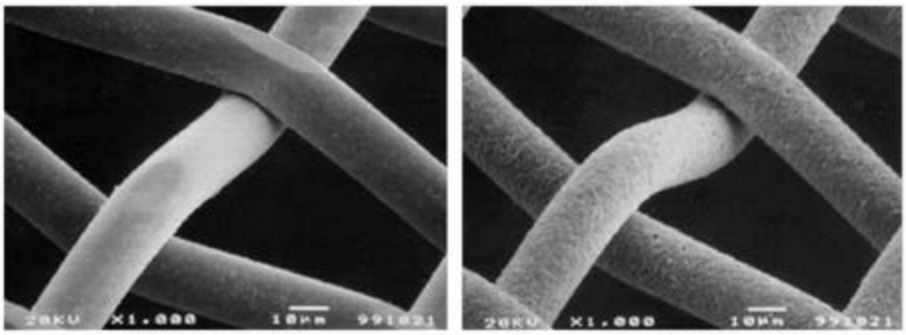

Figure 4: Sand-blast treatment onto a stainless mesh surface

paste laydown. Hence, mesh thickness is a very important key factor to control the required ink/paste deposit and the mesh calendering process gives room for flexible control of the ink/paste transfer amount. The mesh thickness is usually twice as thick as its wire diameter more or less, but the thickness of UCAL – ultra calendered mesh – is nearly equal to the wire material diameter.

4.3 Sand-blast treatment

Murakami's patented sand-blast treatment is applied to roughen the stainless mesh surface. It minimises the halation in the same manner. 4.1 Black screen also maximises the photopolymer's resolution power. Meanwhile, the solvents contained in the paste are held like a thin layer on the roughened surface of the steel wire mesh, so that the frictional resistance is lowered. Consequently, the paste goes through the mesh openings more smoothly and the high aspect ratio printings as shown in Figure 4 and Figure 5 can be reproducible.

5. STENCIL MAKING PROCESS

The stencil making process starts from stretching the mesh onto the aluminium frames at high tension, followed by the photopolymer coating, image exposure, and developing. Various improvements in each process have been implemented.

5.1 Combination stretching – trampoline style: Figure 6

Combination stretching or trampoline style stretching is well known to the industry as one of the popular stretching methods of the screen stencil. It consists of two different materials, such as the stainless mesh in the centre surrounded by polyester mesh to be stretched onto an aluminum frame. A rubber based blade called a 'squeegee' travels across the image area of the stencil surface with a certain print-pressure to let the metal paste transfer to the substrate with image distortion in the screen print being unavoidable. Stainless mesh with no elongation is popularly used for the reasonable repeatability and reproduction of the original artwork, but the downside of the stainless material is that it causes a permanent distortion of the image since it has no elasticity. Polyester mesh is, then, used at the outside of the stainless mesh sheet to absorb the stress repeatedly loaded on the stencil with its flexible elasticity for thousands of impressions with minimal image distortion.

5.2 RT (roller treatment) process

The image area reproduced on the stencil is often deformed by squeegee pressure especially during the initial 50 to 100 impressions when the stress loaded by high tension stretching is released by squeegee runs. RT process is used to release the stress by performing a virtual print run before reproducing the image on the stencil screens so that it eventually minimises the dimensional distortion which may happen during the initial print impressions.

5.3 TU surface treatment

Stencil surface may directly impact on the print quality and, therefore, the direct-indirect film that creates flat and even emulsion surface is highly recommended for fine line jobs in previous items. However, in the event that both emulsion surface and the substrate surface are perfectly flat, the air contained in the stencil openings may have no way out and sometimes it may interfere with the smooth ink/paste mesh filling and eventually invite insufficient ink/paste transfer onto the substrate. You can choose the conventional direct method with liquid emulsion to avoid this unwanted effect but it results in high peaks (at mesh knuckles) and low valleys (mesh openings) more evidently than the direct-indirect method, and the stencil surface becomes much more wavy and uneven. Consequently, it may cause ink/paste bleeding blurred beyond the originally designed patterns. TU surface treatment gives an intermediate solution between the direct-indirect method and the direct method. Moderate peaks and valleys on the stencil surface reproduce linear line morphology with proper ink/paste flow.

5.4 FT treatment

FT treatment is one of the anti-smudging solutions from the screen stencil point of view. In addition to the use of liquid-repellent emulsion, there are some additional ways to achieve it. FT treatment is applied after developing the image on the screen stencil and the over-coated chemical remains not only on emulsion surface but also on the mesh surface; it sometimes enhances the smooth snap-off of the stencil especially when the pattern is wide-open.

6. SCREEN-PRINTING IN PV (PHOTOVOLTAIC) APPLICATIONS

Production of crystalline silicon cell based solar products invented in 1954 started in the 1980s in Japan and Europe, and the global boom became real in 2006 to 2008 in China and other regions by a rapid expansion of the 'turnkey technologies' in the industry. More than a 200 maximum of PV cell manufacturers were vying for position in 2008 worldwide. More than half of those 200 companies have disappeared and only the players with stronger technical and quality background have survived. The survivors have consistently expanded their production capacity and their R&D speed aiming for higher efficiency is very fast (Figure 7).

This demand for high efficiency at low cost is directly related to the required demands of the screen stencil. The conventional crystalline silicon PV cell requires at least three screen-printing processes for backside Ag busbars, backside aluminium, and front Ag grids. The front Ag grid pattern consists of fingers, which

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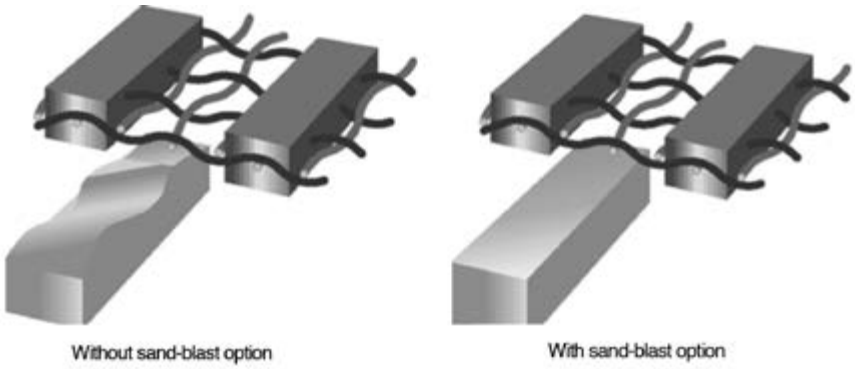

Figure 5: A schematic diagram of printed line morphology with or without sand-blast option

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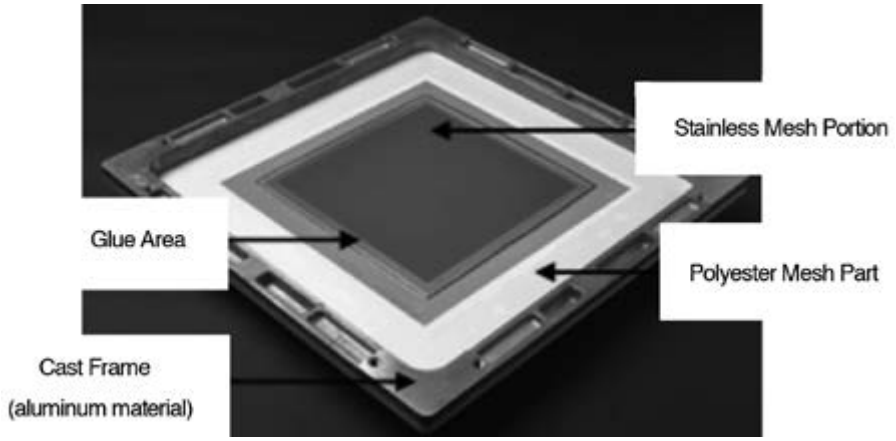

Figure 6: Combination stencil (trampoline style)

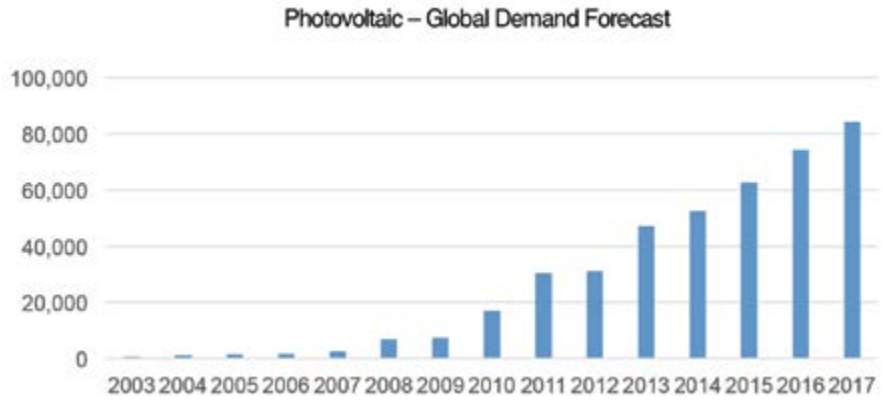

Figure 7: EPIA global market outlook for PV 2013-2017

collect electrons generated on the silicon cell and busbars, which convey the collected electrons toward the neighbouring cell (Figure 8). It is not that easy to make a simple statement to explain whole things in terms of the means and methods for gaining cell/module efficiency of the crystalline silicon PV due to its complex of trade-off of various parameters, but let us attempt to give a simple explanation, as comprehensively as possible, to the points which are necessary for better comprehension of this article.

We do not touch too much detail here about the mechanism of how PV generates electric power because there are many books and articles available in the markets. So we would like to focus on the basics of the crystalline silicon PV, that is the silicon wafer has a p-type semi-conductor layer on its surface and the phosphorus compound is diffused in high temperature atmosphere to generate n-type semi-conductor layer. The boundary of p-layer and n-layer is called 'pn-junction' and the electron (-) and positive holes (+) are generated there. You can create a thick n-layer by doping more phosphorus compound on the wafer front side if you choose. The upside of a thick n-layer is the minimal sheet resistance that encourages the smooth transition of the electrons in the silicon wafer. The downside of a thick n-layer is, however, that the pn-junction locates deeper in to the backside of the cell where it is apart from the front side surface. Therefore, the short wave length of the sunlight, which has high energy, diminishes on its way by half before it reaches the pn-junction. To the contrary, if you make the n-layer thinner to locate the pn-junction at the shallower spot closer to the front side of the cell, the sheet resistance value hikes up greater and the smooth transition of the electrons are interfered with. In other words, some electrons generated away from the fingers may be dead before they reach the finger grid in that scenario. However, it can be generalised that a thinner n-layer eventually performs better for the higher cell efficiency taking a consideration of those pros and cons. It is better to focus on minimising the energy loss of a short wave length rather than worrying about the higher sheet resistance.

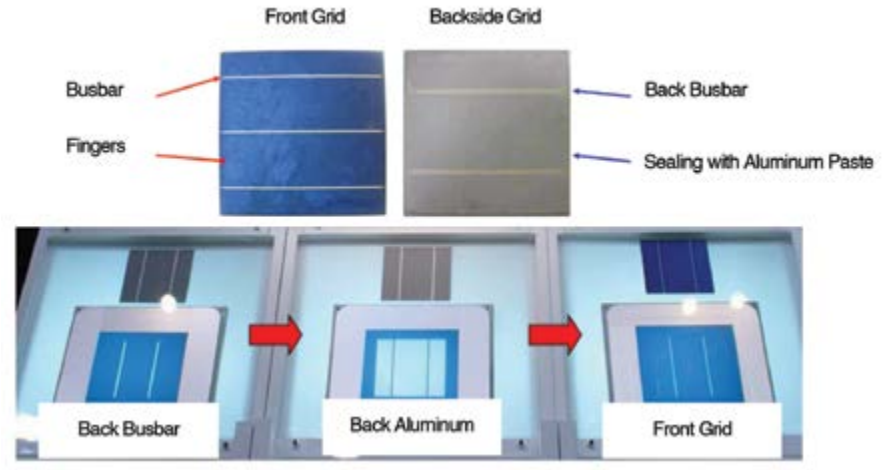

Figure 8: Crystalline silicon PV and stencils

DISTANCE BETWEEN FINGERS

Now, with a thin n-layer wafer, you need to keep the distance between fingers at the minimum level in order to save the electrons as much as possible, which are generated on the silicon wafer, before they drown in the middle of the ocean, apart from the finger grids especially because the sheet resistance is high. Meanwhile, you don't want to see 'shadow loss' growing by increasing the number of fingers (less finger pitch) and the ultimately fine finger print should be, therefore, the only solution to this dilemma. Naturally, fine fingers increase the resistance value if they are reproduced at the same height deposit. Fingers need a certain thickness (height) to maintain the reasonable cross-section area eventually to compensate the increase of resistance value by ultra-fine finger width. Consequently, everybody is eager to pursue 'fine and thick' finger print especially in the dawn of the PV that boomed in the early 2000s.

The industry forecasts the consistent market growth at 150% of today by 2017 but the demands for the screen stencil is not always matching with this forecasted 150%. DP (double print) technology is expected to expand in coming years and the number of screen stencils for the front Ag grid pattern will theoretically double-up in DP applications. Stainless mesh materials and stencil supply may become a big issue if the life and productivity of the screen stencils remain at the same level of today. Extending the stencil life would be, therefore, one of the important topics in the next few years.

When the printed finger width is finer than

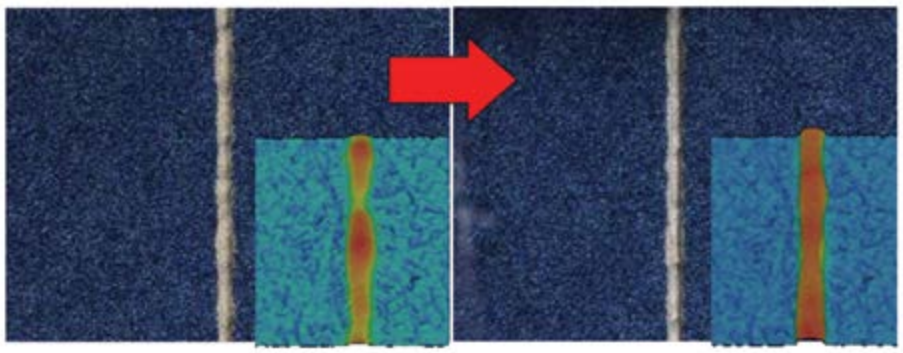

Figure 9: Improvement of finger linearity by DP (double pass printing)

50µm on the silicon cell, the screen-printing process technically and increasingly becomes challenging. Screen-printing the 'fine and thick' fingers in this level of fineness is not easy with conventional single-pass printing and many players have looked more closely into the DP (double print) technology, which prints fine finger patterns one upon another. Theoretically, the finger alignment between the first print and the second print must be controlled within half of the finger width of the original artwork; the stencil-to-stencil dimensional stability is one of the most critical agendas of today.

There are some solutions available without a huge increase of cost and the industrial R&D efforts in this subject is on-going among stencil suppliers, press manufacturers, and major metal paste vendors. One thing we would like to highlight as an upside of DP is that, with the first print, Ag paste works as the 'absorption layer' of the second print Ag paste; the risk of finger interruption with DP is substantially minimised compared to conventional SP (single-pass print) – see Figure 9. We see a clear increasing trend in the industry of the PV manufacturers in recent years who aim for the mature process development of DP technology and the demands for the aforesaid dimensional stability has become an issue in addition to the fineness of the finger reproduction.

CLOSING STATEMENT

Many new processes other than screen-printing used to produce electric circuits and grids have been introduced in the electronics industry one after another for the past few years, including photo lithography, plating, and other 'vacuum environment required' processes to replace conventional screen-printing methods. However, none of them has any convincing evidence of a better cost-performance than screen-printing and most of the new technologies have ended up being disregarded or used only within a niche market, despite the sensational sales pitch in the beginning. It is our firm belief that screen-printing technology shall remain at the dominating position in volume production processes so far as our challenges for 'better than today' process technologies continues. ■

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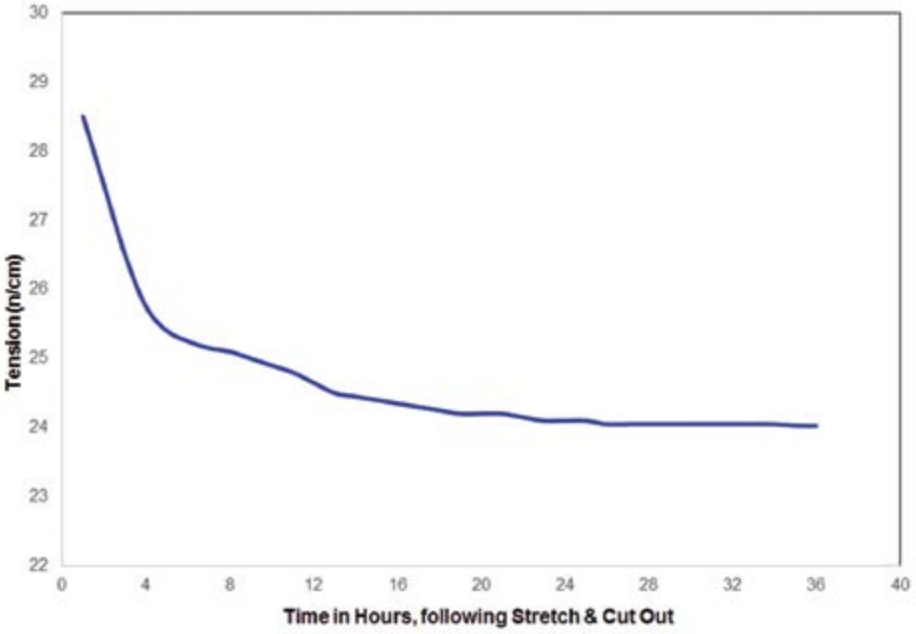
IMAGE ACCURACY FOR TIGHT REGISTRATION PRINTING

Art Dobie offers a few pre-press suggestions to help maintain accuracy

Screen-printing applications incorporating tight pattern registration tolerances are not easy. There are quite a few press settings and motions during the actual print cycle which directly affect printed registration accuracy, such as press levelness, screen off contact gap, and overall area deflected by the squeegee to name just a few. Of course, all of the press's influence on pattern registration doesn't even transpire until the completed screen leaves the screen room with a print image already fixed in place. Any distortion in the dimensions of the print image burned into a screen stencil is almost impossible overcome with press adjustments. Paying attention to a couple of key pre-press steps can help maintain dimensional accuracy of the screen image and reduce chances of it being out of tolerance before even reaching the print floor.

Printing screens are comprised of three main components and each of them has influence on the dimensional stability of the print image. Let's start by examining the most basic of the three screen components, which is the screen frame. A screen frame's paramount functions are to act as an inkwell during printing, and to be robust enough to hold the screen mesh dimensionally stable while under the tension.

Screen mesh reaches tension due to elongation that takes place during the stretching process. During the screen tensioning process, stainless steel wire cloth is typically elongated less than 1% to reach common tension levels. However, polyester mesh can typically elongate anywhere from 3% to 8% when stretched to typical industry acceptable tensions. In essence, "stretching mesh" becomes a fairly literal term. For example, even with high modulus PET mesh types which exhibit low elongation properties, a 380 thread count per inch mesh can open up to 368 threads per inch once stretched to proper tension level. Screen mesh moves and changes during the tensioning process (it continues to change after the stretching process and we need to make accommodations for that as well). Considering, we need a screen frame that is structurally strong enough to withstand the stress applied to it by the tensioned mesh without deflecting inward or distorting.



This chart shows an example of tension change over time

THE BETTER INVESTMENT

As previously mentioned in the article 'Harmonising screen components for high resolution screen-printing', based on the total cost of mesh bonded to a given screen frame over the course of its lifetime, it is always a better investment to purchase the heaviest wall thickness available for the size of your static frame profile. The screen frame is the backbone of our printing plate and a heavier wall thickness helps it maintain dimensional stability under the forces applied by mesh tension. The more stable your screen frame is, the better it can assist in holding pattern registration and dimensional accuracy. Understanding that the mesh moves dynamically with tension, the last thing we need is a frame that moves as well.

As the mesh changes with elongation during stretching, so too does it continue to change after the stretching procedure is completed. During the stretching process, we bring the mesh up to tension over a period of time (some screen makers taking longer than others). After we are satisfied with the tension level we have reached and the mesh is secured to the screen frame, tension is commonly released from the stretching mechanism (mechanical or pneumatic) very quickly and the tension force is abruptly transferred directly to the screen frame.

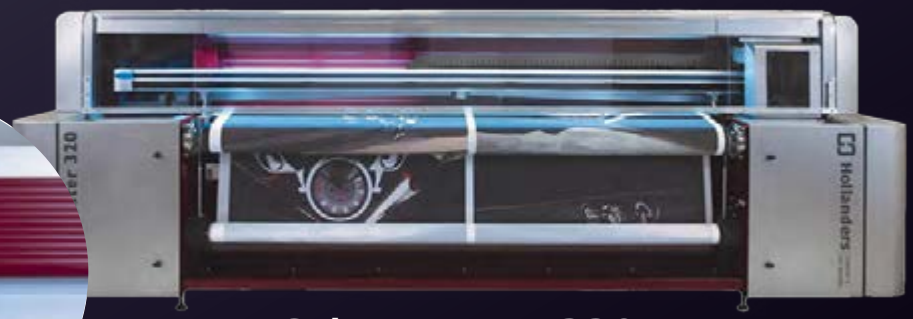
ADJUSTMENT AND STABILISATION

Over a period of time immediately following the removal of the stretched screen from the stretching device, both the screen frame and the tensioned mesh adjust and stabilise. In addition, polyester mesh experiences 'cold flow', in which there is molecular alignment of the polyester molecules occurring throughout the individual fibres. The majority of this phenomenon actually occurs during mesh manufacturing but there is still a small amount which takes place during screen stretching.

As the screen stabilises following the stretching process, there is usually a loss in mesh tension. How much tension loss actually occurs depends on a number of factors, including frame strength, tension value, and the stabilisation period incorporated in the stretching procedure. Most of this tension change takes place in the first 24 hours following completion of the stretching process. The amount of tension loss that occurs while the screen stabilises following the stretching process can be reduced by the addition of a stabilisation period in which the mesh is permitted to sit and adjust during the stretching procedure. By allowing the mesh time to stabilise during the stretching process, the resulting tension loss after stretching can be minimised.

Continued over

ColorBooster 250



ColorBooster 320

ColorBooster DS

It's all about the result

Of course a high-quality printer is of great importance, but even more important is what rolls out of that printer. The customers of Hollanders Printing Systems do not just have need for a printer; they need perfectly printed Fabric. At Hollanders we think in solutions, in optimum results. The one and only question we ask ourselves is: What are the needs and wishes of our customers and potential customers - now and in the future - and how can we meet those expectations? Hollanders Printing Systems develops, builds and sells sophisticated machines and software for the total textile market. In line with the machinery Hollanders also offers support, service, supplies and leasing.

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Hollanders masters on textile

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Typically, a five, 15, or 30 minute stabilisation period is incorporated once the mesh has reached target tension during the stretching cycle. While a longer stabilisation period helps maintain more of the initial stretch tension over time, even a few minutes of stabilising provides some benefit in reducing tension loss compared to no stabilisation period at all.

The key point is that mesh continues to change for a period of time following the screen stretching process. A few methods that can be incorporated in stretching procedures include pre-bowing of frames, and using structurally stable screen frames and lower elongation/higher tensile strength screen mesh. Adding a stabilisation period to the stretching procedure can reduce how much the mesh changes after stretching. However it will still exhibit some change, which is typically evidenced by tension loss.

GOOD THINGS COME TO THOSE WHO WAIT

Recognising that screen mesh is still stabilising during the first 24 hours post stretch, it is wise to refrain from exposing the image onto a screen until that 24 hour window has passed, (or at least not until the following day). This will give the screen a chance to stabilise and not add undue distortion to the burned pattern while it is still adjusting to life under tension.

In this day and age of instant gratification, no one likes to wait. To get a bit of a head start, a few hours or so following stretch and cut out, a newly tensioned screen can be coated with emulsion or Cap film can be applied, but the exposing of the print image into the screen stencil should still wait until the 24 hour stabilisation window has passed.

Emulsion is able to move with any changes in the screen mesh while it continues to stabilise; but if the screen is imaged before it stabilises, it can likely enter some amount of dimensional distortion to the print pattern.

START IN FRONT OF THE 8-BALL

The screen artwork needs to be accurate to the design dimensions and, if in hard copy form (film positive), needs to remain as stable as possible. Once a film positive has been output, taking a dimensional measurement check is imperative. Make sure that the dimensions on your film positive match those of the design within the tolerance required for the job. If the dimensions are out of specification tolerance on the outputted film, check the design file again, or have the film outputted by a professional. This will help determine if you are accurately outputting a bad design file, or if there is something amiss with your film output process and/or equipment. Once you have confirmed that the film positive is good for use in screen imaging, it is critical to make every attempt to keep it that way.

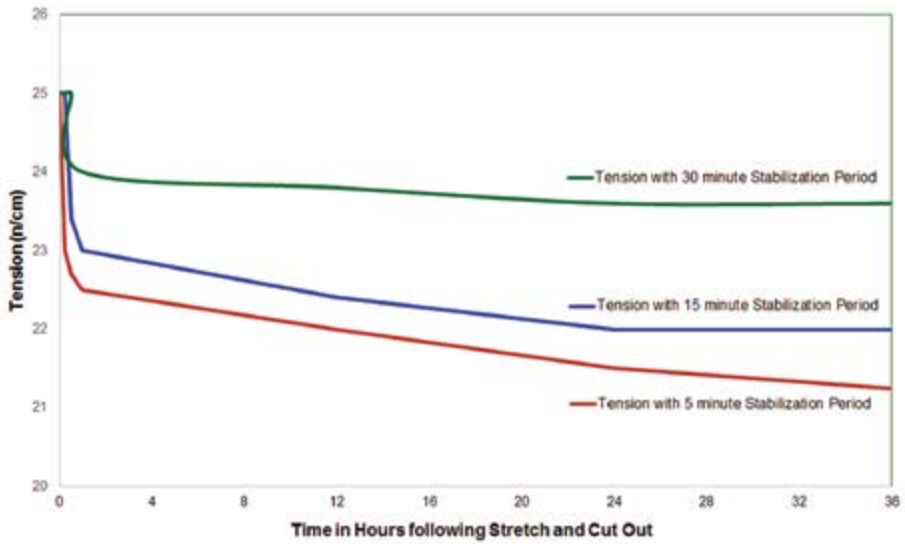
The base materials of most photographic and ink-jet films have some amount of sensitivity to any changes in temperature and relative humidity. It is not unusual to output film positives in a location other than the screen room. If the film is generated in an air conditioned office space, the relative humidity where the film printer sits is usually different from that in the screen room where there is typically a degreasing/washout sink and maybe another for reclaiming. The humidity in the screen room in the morning may likely be different from that in the afternoon, or on rainy days versus dry days. It's not unusual for all of those conditions to be different from the environment where the film positive was generated. Even a 10% to 15% increase in the relative humidity in the area where film positives are stored and used (compared to the humidity when the film was produced) will likely cause the positive to exhibit a noticeable amount of global spread of the plotted image dimensions. Knowing that the image dimensions on the photopositive that will reproduce on the screen stencil can choke or spread based on the day-to-day environmental changes the film experiences during its lifetime, it would be wise to actually measure and confirm the image dimensions on the positive before each use, to help prevent burning an accurate reproduction of a distorted pattern onto the screen.

CHECKING THE PRESSURE

When using the traditional exposure method of placing the screen and film positive into a vacuum back, make sure that the vacuum pressure is not excessive. Too much vacuum pressure can easily expand the screen frame when the vacuum blanket pulls down and wraps around the frame. Vacuum is used to create intimate contact between the surface of the screen and the film positive. The necessary amount of film-to-screen contact can usually be achieved when the vacuum gauge reaches 20 to 22 inches of mercury.

Once a screen is imaged, confirming the screen pattern dimensions by actual measurement should become part of your standard screen inspection process, just as other important steps such as pin-holing and EOM measurements.

The pre-press end of maintaining tight tolerance print registration begins with proper preparation in the screen room. Incorporating robust frames, repeatable stretching practices with fixed stabilisation periods, adherence to specified process steps and timings, and confirming and maintaining dimensionally suitable film positives will help to ensure that you're sending the best possible screens to press for those tight tolerance applications. ■



This chart demonstrates an example of tension change versus a stabilisation period

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MOVING UP WITHOUT COMPROMISE

Rowan Bloemberg overviews the value of 3.2m textile printing

Rowan Bloemberg

The new Hollanders ColorBooster 320

The market for digital textile printing is constantly changing in its expectations, requirements and demands, with end customers of machines being the catalyst for evolving the platforms that are brought to market. The users are the people who, in turn, are driven by their clients' needs in terms of quality, colour accuracy and width. But it is the responsibility of the manufacturer to address all of the challenges by adapting and enhancing technologies so that they accommodate present-day and future trends.

For Hollanders Printing Systems, whose digital textile machines have successfully passed the test of time during the past decade, it is knowing where and when to move with future developments. In general terms, assessing the potential can be relatively straightforward but realising it can be less easy because of obstacles such as production cycles and manufacturing capabilities and capacity. This is where a smaller company can score because it has both the flexibility and versatility to respond to changing market directions more quickly and with far less disruption than would be the case with machines constructed in a 'production line' environment.

This philosophy and practical ability were both key elements behind the development of the Hollanders ColorBooster 250 which was targeted at the specific market segment that wanted a machine of that size. Not only that, the requirement was for a modular platform that was priced attractively and which could be enhanced to provide additional features as and when a user's budgetary and productivity needs were ready for the next stage in throughput.

MARKET DEMAND

However, the ColorBooster 250 was never going to be a static design and build that couldn't be extended to accommodate market demand and, as result, it was inevitable that a 3.2m version of the machine was going to be needed to sit in line with universal trends that show a growth in popularity for using wider materials. But, unlike options where evolution can take a long time in order to take account of the varying parameters and build requirements for a larger platform, the intention in the earliest concept of the Hollanders 2.5m printer was that, ultimately, it could transition to a larger model without the need for costly and time-consuming re-engineering. Even though the jump up from one size to the next is less than one metre, there are considerations that need to be taken on board to make sure there are no compromises when producing a wider option, including print-head behaviour and performance, textile handling, and overall consistency across the whole print area.

Hollanders Printing Systems already carries long-term experience of the prerequisites that are essential in a 3.2m textile printer. Its ColorBooster XL high-end production machine has proven stability at this width and has become a work-horse for companies that need its advanced, reliable

features. Likewise, the company's ColorBooster DS double-sided digital machine is available in a 3.2m width and, again, its superior levels of engineering and construction have led it to become a solid and stable unit that is ideal for all run lengths and environments that include industrial as well as commercial fabric applications.

A LOGICAL MOVE

Using the criteria from its existing 3.2m technologies and the cost-effective rugged features of the ColorBooster 250 have made it a logical move to introduce the ColorBooster 320. This, in effect, combines the elements and the knowledge required for the development of both sizes of platform and results in a wider format machine that is suitable for first-time users as well as businesses wanting to produce larger applications.

Like its narrower counterpart, the ColorBooster 250, this new addition to the Hollanders portfolio is designed and manufactured as a modular and fully upgradeable printer that is as well suited to entry-level users as those who already work with digital textiles. It accommodates dye sublimation transfer (low energy) and disperse (high energy) direct-to-textile inks, and can be produced as a bespoke system to suit individual user needs. Options include the numbers of print-heads and colour channels according to speed requirements, as well as the type of application being produced. As standard, the ColorBooster 320 incorporates the Hollanders proprietary media handling capability, its on-board remote support system, plus options for integrated humidity and temperature control, enabling the printer to be used in virtually any environment.

UPGRADEABILITY

In its standard format, the ColorBooster 320 is supplied with two Ricoh MH5420 print-heads in a four-colour configuration, but it has the ability to be upgraded quickly and easily to eight print-heads as a maximum. Like the 2.5m option, it is specifically designed for the production of soft signs and displays with its base CMYK ink set providing excellent overall colour accuracy and saturation with strong, dense blacks that are so often lacking in digital textile solutions.

Additional optional features include not only climate cooling and heating plus integrated dust and humidity control. There is also a facility to provide on-board cleaning that utilises a print-head 'shower' to reduce down-time and maintenance procedures.

As an alternative to more commonly used ink technologies, the aqueous-based formulations used in digital textile printing can challenge many applications that, traditionally, have been produced using solvent-based, latex or UV-curable chemistries. With the lighter weights of polyesters and blended fabrics continuing to grow in popularity for many sign and display jobs, there is also the consideration that both the processes and the results lead to greener practices and reduce overall environmental impact.

By addressing the demand for a 3.2m version of its ColorBooster 250 with an attractively priced, rugged digital textile printer that will appeal to sign-makers and display producers, Hollanders believe it has tackled all of the questions asked by those interested in, and who need, its technologies. Summing up, the company has utilised the answers to these queries relating to overall market requirements by producing the ColorBooster 320 that will cater for a wide range of end applications and, above all, provide users with the ability to choose the features they want without compromise. ■

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INDUSTRIAL SOLUTIONS FOR DIRECT DIGITAL PRINTING

Jean-Louis Dubuit describes the impact of digital technology introduced last year to complement an established range of screen-printing solutions.

Jean-Louis Dubuit reports positive customer reaction to Machine Dubuit's new digital technology

Having been involved in the screen-printing sector for more than 80 years, Machines Dubuit entered the digital market last year with the introduction of the 9150 digital cylinder system as a reaction to market dynamics and to better meet its customers' expectations for volume considerations, just-in-time production and customisation change.

"The 9150 has been received very well," enthuses company owner and chairman, Jean-Louis Dubuit. "We have been concentrating on the premium market where this application fits best and offers maximum economic benefits. Customer feedback has been very good".

The main advantage of the 9150 is the option to digitally print small runs and customise a product with no pre-press element. However, Jean-Louis Dubuit is keen to point out that the new digital technology complements rather than replaces its screen-printing range. "We've opened up a new market that was not previously there. There are things that digital will not do and there should always be a combination of both processes," he asserts. "With the 9150 and our existing range, we are now offering an increased range of solutions. There are many opportunities for both processes".

The Dubuit 9150 is designed to work with glass and plastics packaging, in the same way that screen-printing has done in the past. "The 9150 has already proven successful in the plastics industry in the last 12 months and now opportunities for the glass sector are just beginning," states Dubuit. "The main drawback in general for glass is that because the print is rather transparent, you need to have a white background. This can be unusual for the glass industry which is used to using enamels that can print on transparent glass".

But with the difficulties of screen-printing a photograph in four colours onto glass packaging without using labels, new digital technology such as the 9150 offers expanded possibilities. "If you take the cosmetic glass industry, for example, the print is very fine and sharp, but with only one or two colours," explains Dubuit. "Its taking time for the glass industry to realise we can now print onto glass digitally with four colours, but the customer response is encouraging and we are in the market for the long term".

The Dubuit 9150 provides the option to digitally print small runs and customise a product with no pre-press element

PRODUCT DEVELOPMENT

Building on the success of the 9150 machine, which was designed with a maximum printing height of 72mm, the range has already been extended with the recent introduction of a modified 9250 model for heights of up to 140mm. Sister company, Encres Dubuit, are suppliers of the Evojet UV-Curable CMYK and white inks plus varnish used in the 9150 and 9250 machines, and further recent innovation includes modifications that ensure even higher scratch and solvent resistance on glass. "The inks have worked very well. Despite the implications of stringent new EU regulations, we are in an excellent positon to deal with such challenges and are also currently looking at a new series of inks specifically for plastic applications. More interesting developments will follow this year".

Having reported particular success in Germany and USA since the introduction of the new digital technology, Dubuit is confident of wider-spread interest in the coming months. "In difficult market conditions, I am happy with the progress so far. The range of solutions we can now offer the customer makes us very competitive". ■

Jean-Louis Dubuit is owner and chairman of Encres Dubuit and Machines Dubuit

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CLOSING THE GAP BETWEEN DIGITAL TECHNOLOGY AND TEXTILE MARKET NEEDS

Nufar Kiryati explores the trends and barriers

The textile industry is one of the world's largest industries and it has come a long way. It represents 30 billion yards of material volume on an annual basis world-wide.

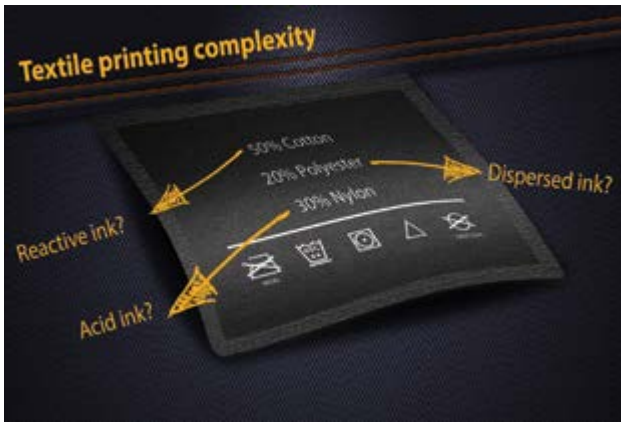
Digital ink-jet printing has already made an impact on the world of signs and promotional graphics turning it into an on-demand, fast-turnaround industry. What's keeping it from impacting the textile printing as well?

Industry data shows that after a decade of advances in digital printing technologies for textile, only 2% of the world's printed textiles are produced this way. This raises an important question — what is the reason digital textile production is still a niche market? And what are the trends and barriers that influence the textile market and its technologies.

CHANGING MARKET NEEDS

When examining the textile market, especially the fashion design sector, we witness a change in its needs. There is a growing demand for greater variety of colours and designs within quicker turnaround cycles. As a result, textile designers are rethinking their approach to production and manufacturing of textile. Whether designing for sportswear or a fashion line or, even, for furniture upholstery all these markets are changing the way they present their style. Styles and trends are constantly changing in today's fast paced world. Thus, short cycles of fashion lines demand fast turnaround in production and manufacturing of textile.

Responding to this trend of fast fashion and switching from mass production to mass customisation, digital textile production is becoming the cost effective choice for brands in both the apparel and home markets. Textile print shops are then forced to find new and innovative ways to provide printed fabrics while minimising cost and waste.



The complexity of using different types of inks and treatment for different fabrics

MULTIPLE BENEFITS

Digital printing is a relatively new technology in the textile market, but it offers multiple benefits to the traditional textile printing process. It has dual application in printing, acting both as a sampling and production tool. In sampling, digital printing offers immediate results, provides tremendous flexibility in design and colouration while saving time and money. As a production tool it helps to minimise inventory waste as there is no discharge of dyes and chemicals, reduce downtimes, reduce costs and provide the option for mass customisation.

The majority of digital printing on textiles is done today mainly on polyester fabrics using dye sublimation. However, there are more applications which can benefit from short run digital printing, enabling printing on natural fabrics as well as on blended fabrics. Fabrics, ink colours and ease of creation without the limitation of minimum yardage requirements, enriches printed fabrics to be a unique piece of custom art.

REACTING TO DEMAND

So what's holding back fabric printers from responding to this growing demand? Why aren't they producing textile printing on all fabric types under the same printing line? In today's digital textile industry the limitation is two-fold. First, there is the fact that different types of inks are required for different types of fabrics. Next, each fabric type is being printed with specific ink technology which requires dedicated printing machinery per application.

Reactive type ink is the most commonly used for the textile industry today as it is used for home textile and fashion fabrics. It is mainly used for cotton fabrics. Acid inks are used for sportswear made from nylon and lycra fabric types, and disperse ink type is used for polyester fabrics for home décor and flag printing.

In addition, different- pre and post-treatment equipments are required for different types of inks. Acid and reactive inks require a wet post-treatment and the printed fabrics need to undergo several steaming, washing and drying steps. On the other hand, pigmented and disperse inks require a dry-post treatment as they need a heat fixation process before using the fabrics.

This factor limits the flexibility of a single print house to provide numerous types of services. Moreover, print shops tend to focus only on one single process line as each type requires a different technical experience and usually they specialise in one type of fabric printing. Secondly, traditional digital textile printing requires pre- and post-treatment to the fabrics to maintain rub resistance and long term wash durability. These limitations affect the cost effectiveness of short-run textile printing as the need to have different types of inks and printers and different types of treatment are time consuming and more expensive.

A COMPLEX PRINTING PROCESS

Digital textile technology offers today a complex printing process. There are specific inks, treatments and machinery needed for different types of fabrics. With current types of inks, different types of fabrics such as cotton, nylon, polyester and viscos cannot all be printed using the same printing process.

There are many digital printing technology issues that will determine the future of the textile printing market. These involve print speed, resolution/drop size and configuration, ink performance, substrate handling, colour control and colour matching, wash and wear fastness and fixing and curing. The biggest player that will no doubt be the main influencer in this emerging market is the ink and it could hold the solution for simplifying the complexity of digital textile printing.

Today, the choice of the fabric type dictates the choice of ink. There are different types of inks used for different types of fabrics and applications. Furthermore, each fabric type requires a different pre- and post-treatment equipment.

KEY ADVANTAGES

There are key advantages for running a digital textile printing business. Cost reduction, eco-friendly solutions and short-run production with mass customisation are among the main features that digital textile printing brings.

Is the technology at a tipping point where a simple modification is needed in order to meet the textile market demand? The next phase in digital textile printing will depend on formulating a new concept in the printing process to allow print shops to be synchronised with the market trends and offer printing solutions on all available fabrics under one simple production line. ■

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DRIVING 'STATE OF THE ART' SCREEN-PRINTING INNOVATION

Marcus Timson explores the combination of screen-printing and film insert moulding

Marcus Timson

I recently visited MacDermid Autotype, a new InPrint 2015 exhibitor and a company famous for innovation for industrial screen printing. It is a global industrial manufacturer of high quality precision coated films and blended liquids for use in the printing, automotive and electronics industries. Its product range includes overlay films for membrane touch switches, stencil products, cleaning chemicals for screen-printing, film insert moulding (FIM) and graphic display films.

Much of the discussion during my visit focused on the evolution of the car and how manufacturing has changed to increase sophistication of the vehicle and the interface with the driver. The visit was a real eye-opener in terms of innovation and cutting edge technology for industrial production using screen-printing.

Today's cars virtually drive and maintain themselves. In the age of smart technology we do not need to know how to maintain a car. We just drive it, such is the sophistication of the intelligence behind automotive production and the technology utilised.

RISING TO THE CHALLENGE

Screen-printing has risen to the challenge to play a key role in functional and decorative print for car manufacture for all of the world's leading automotive manufacturers.

These days many of the top automotive manufacturers utilise the FIM process (film insert moulding) also known as IMD (in mould decoration) as part of the manufacturing and decorating process for their cars' interiors. This is the 'bling', the sparkle and the finishing touches that make the interior of the car shine. However, it is also the functional element of in-car entertainment, function and orientation.

Why is interior decor important? Aside of the functional aspect, in our smart technology age, expectations have radically changed. We assume that products will endure, remaining robust despite the forces we throw at them and we do not tolerate any imperfection.

The car remains the second largest item we are likely to ever invest in. But a car is no longer just a practical mode of transport. It is a statement, and it needs to reflect and, to some extent, define who we are. It is an extension to our home. So when consumers drive cars they must feel good about it. It also helps to justify the large amount of money we have invested in something which, unlike a house, depreciates in value quite quickly.

MULTI-SENSORY EXPERIENCE

A car is a multi-sensory experience where touch is just as important as sight, smell and sound – so people want to be able to touch different surfaces that will give them a unique type of experience. They also want the finishing aligning with their status. A term often used to describe this experience is 'haptic'.

Haptic is any form of interaction involving touch (from Greek ἅπτω = "I fasten onto, I touch"). It can mean haptic communication, the means by which people and other animals communicate via touching or haptic perception, the process of recognising objects through touch.

As the motor car is now a sensory experience, it makes sense that automotive manufacturers are constantly looking at new methods for improving the delivery of this experience. Although a commonly used process now, FIM is actually a relatively recent innovation that uses screen-printing at the core of its process. It certainly proves that screen-printing is still very innovative. Retaining its position as the best process in terms of durability, precision and finish.

Industrial printing the interior decor for cars is not easy. Think about how we use cars

Today's cars offers a multi-sensory experience

This light switch array was produce using FIM

A typical radio panel in a present day car

An example of a heat part produced with the help of screen-printing

– the humble automotive has to withstand a number of different forces. If you have a family, it has to contend with any number of challenging materials such as sun cream, foods, liquids including sugary drinks and so on. All of these are difficult substances for a functional display to withstand as they can have corrosive properties. And all of this used to be printed onto the top surface – but this is no longer enough to provide consumers with the kind of experience they expect whilst being robust enough to cope with coming into contact with these substances.

THE FIM PROCESS

Utilising MacDermid Autotype films and screen-printing, the FIM process is highly effective as you can protect the graphic behind the film. Using the second surface or sub-surface you literally print back to front. What also enhances print quality further is you can print this onto a flat surface and then mould the substrate to create the 'in car entertainment' display, enhancing the quality even more.

At the moment the FIM process dramatically improves the presentation of the car interior through decorative printing. However, in the future, this could be further combined with functional printing using conductive inks to enable elements within the display to work. The beauty of this is that it can be produced as one component and that it can be environmentally sealed meaning it is both waterproof and air-tight.

Drivers want to have something soft enough to work with but hard enough to endure human contact which can deteriorate things quite quickly. Therefore MacDermid Autotype has to test thoroughly a number of likely substances that could affect the substrate including tomato ketchup, car cleaning agents, sun lotion, sugary drinks and many other things that might provoke deterioration.

MORPHING CAPABILITY

In terms of producing the graphic itself this material has to be both soft and hard. It must be soft enough to form but, then, it needs to change characteristic and morph into a very tough surface.

Having this soft and hard characteristic is challenging. The substrate is screen-printed, dried, formed, and then the film is UV cured to harden it even further. You will then back injection mould this with molten plastic.

If you are injecting molten plastic directly onto the printed surface the inks have to be able to withstand these very high temperatures. And you want to make sure the ink retains its colour density and doesn't wash out. These screen-printing inks have to be very specially formulated for this process and are therefore an incredibly vital component.

The car is an incredibly demanding environment. In addition to contending with corrosive and abrasive substances, a car's interior temperature can vary from freezing when stationary to more than 50 degrees C in the middle of summer. When considering this, the substrate, the ink and the manufacturing process are vital to providing the driver with the kind of experience and performance they expect, especially when they are investing a huge amount of money for their vehicle of choice.

Screen-printing is an extremely flexible and effective production tool, is the enabling process in FIM and continues to evolve to meet the modern demands. Attend InPrint 2015 to get the latest on cutting edge screen-printing and FIM for industrial manufacture. ■

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CHANGING PLATFORMS

Michel Van Vliet describes what can be expected from Macintosh based software

Rolandprintstudio can be installed on a Macintosh with an Intel core and OS 10.8 or higher

Rolandprintstudio is a powerful new RIP and print management software package for Macintosh OS X that Roland DG recently launched across the EU region. This feature-packed software is much more than just a RIP and is available for use with all current Roland DG printers, printer/cutters and stand-alone cutters. It can also run a selection of previously launched Roland products.

Offering a host of time saving and efficiency promoting features, Rolandprintstudio can be installed on a Macintosh with an Intel core and OS 10.8 or higher. This way, it enables Mac OS X users throughout the wide-format digital print market to manage their print production process quickly and easily.

DEMAND FOR MAC BASED RIP SOFTWARE

Rolandprintstudio is the VersaWorks alternative for Mac users. VersaWorks, which runs solely on PC, is considered a brilliant extra when buying a Roland DG printer. This is not only because it is bundled with every Roland printer and printer/cutter at no extra cost, but also because of its simple and straightforward features, which in many cases are tailored to user requirements. However, there has been an increasing demand for RIP software that allows users to control their Roland printer from a Macintosh platform.

The demand originates from graphics houses and print businesses that are loyal users and advocates of the Mac OS X interface and from customers in higher production environments, eg with our VersaUV flatbed series, who wish to use an even faster RIP. We wanted to ensure that we satisfied these business requirements with a software that maximises the printer's capabilities and complements our highly popular PC based RIP, VersaWorks. By providing a powerful solution at a competitive price, Rolandprintstudio definitely meets these demands and delivers much more besides.

ADOBE PDF PRINT ENGINE

At the heart of the Rolandprintstudio software is the Adobe PDF Print Engine (APPE), which renders artwork using native Adobe functionality. This enables users to work quickly and accurately throughout the entire RIP/print/cut process, thus increasing overall production speeds and eliminating problems often associated with layers and transparencies. Rolandprintstudio removes potential issues as it interprets PDFs using the same method that was used to create the original file.

With 64bit processing capabilities, Rolandprintstudio is able to maximise the available operating system resources and to deliver very fast RIP speeds. It utilises the full memory within the 64bit processor (versus just a part of the processor as do other RIPs) along with Mac OS X using fewer resources to run – which hugely speeds up processes. It supports files up to 1TB, for printing and for cutting as well.

With Rolandprintstudio you can support two printers and a cutter simultaneously. For instance you can run both a supported printer and cutter, or two printers at the same time.

INTUITIVE INTERFACE

With an exceptionally intuitive interface, Rolandprintstudio boasts some of the most advanced workflow assisting tools to prepare files for printing and cutting. It truly is a

Rolandprintstudio is available in eleven languages, and is supplied on a USB key

The program has an exceptionally intuitive interface

combination of design, layout and production functions (such as automation to repeat jobs use colour swatch books and create ICC profiles).

The program opens with a vertical image bar on the left showing the images you will use. The image bar stores and sorts images for quick access. In the image bar, you can hold as many live pieces of artwork as needed. These can be sorted in various tabs to organise your work such as by name, customer or creation date. To preview or crop a job, you can drag and drop an image onto the desktop.

The application bar shows the full list of available tools. You can apply as many functions to the image as necessary.

With Rolandprintstudio, you can also automate repeat jobs. The workflow editor will help you set-up your optimal workflow by putting actions in your preferred sequence. If a particular customer always places an order for 100 copies of an A3 print, you can create and save a workflow with these parameters and link it to a hot folder. Every image that is placed in this folder, will automatically be converted to the correct size and the correct number of copies.

EDITING AND APPLYING COLOURS

The new RIP software comprises all industry standard colour libraries, including all RAL, HKS and Pantone colour swatches. With most Roland DG printers, you can print speciality colours, such as white, gloss or metallic. With Rolandprintstudio you can easily create these speciality colours from CMYK data.

These speciality colours could be under a CMYK or around a CMYK shape or image, and are also definable from any spot colour or contour. This removes the need to create the speciality colours separately in design software and provides perfect pixel for pixel registration.

When defining the PMS colours that are going to be printed by the CMYK ink set, the possible difference in colour is visualised. Obviously, you can save your 'own' colours in a special library that you can access whenever you need it.

There is also an embedded profiling module, at no extra cost, to enable operators to create custom ICC profiles to deliver accurate colour reproduction whilst optimising ink consumption.

Additionally, an advanced nesting facility maximises media usage to save on media costs. You can easily combine the same, or different, images you wish to print cost-effectively on a sheet. Auto nesting will help you find the best mounting option without counting numbers, although you can also type in a preferred 'assembly'. Most RIPs have this function, but it is particularly effective in Rolandprintstudio thanks to its ability to crop images to contour lines.

There is also a step and repeat function that controls placement of multiple copies of artwork. Also provided is the ability to clip to a contour path to maximize media usage.

CUTTING CAPABILITIES

Positioning of crop marks and contour cutting (on the basis of vector lines prepared in programs such as Adobe Illustrator) is also included. You can prepare files for combined printer/cutters or add marks that can be read by a stand-alone cutter from Roland DG.

Other features include an advanced tiling functionality and template driven tiling to facilitate printing of larger graphics. Tiling is the term for printing files that are larger than the media width, so there is the need to break them into sections and re-join them during the construction or installation.

Template data for a tiling job can be saved, so that new images can just be dropped into the same tile format and re-produced easily. You can enter the poster size, width, height, margins, frame and scaling and tile set-up in columns and rows, as well as print constraints. Also, there's the ability to print grommet locations for accurate post print finishing.

When printing a tiled image, the application guide button produces a PDF, which shows the image as a finished piece with all of the separate tiles marked up. On the following pages, each individual tile print is listed with a reference number to the overview. The application guide can be passed onto the fitting team – handy as often the printers or fitters are from different companies or teams.

COSTING FUNCTIONS

An in-built calculator with costing function enables you to automatically calculate print costs for easy quotations. When inputting data, Rolandprintstudio will calculate the cost of multiple types of media per square metre. By also inputting ink costs, the inbuilt function will analyse each print file to calculate the combined media and ink costs, speeding up and increasing the accuracy of the quoting process. Finally, a sophisticated spooler function tracks what the printer is doing at a certain moment and facilitates quick reprints via easy access to historical job settings. ■

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DIGITAL ALTERNATIVES FOR CODING AND MARKING

Sophie Matthews-Paul discusses the criteria required in today's processes

In day to day life the use of marking and coding plays a vital, if quiet, role that serves many purposes from which consumers, businesses and entire industries often benefit without realising or appreciating the challenges that the methodology can present. This is a valuable and essential process that combines purposes that incorporate identification, traceability and authenticity, aiding logistics and preventing passing-off or counterfeiting. In common with other technologies growing in demand throughout the printing industry, the segment for marking and coding is one where digital alternatives are growing in relevance and importance as the dynamic for change in manufacturing processes and logistics lends itself to greater versatility, on-demand and just-in-time production, and mass customisation.

Marking and coding of any item gives it an identification that might be unique or be used to represent the batch to which the product belongs. This type of print can be used to generate numbers and short text, safety symbols, bar and QR codes plus other matrices that assist with storage patterns, stock rotation and logistics.

Throughout the past three decades there has been an influx of new technologies that has brought computerisation within reach of manufacturing industries. Today the methodologies associated with marking and coding are able to accommodate the specific idiosyncrasies of the processes associated with this kind of printed product. This has brought improved reliability in quality, the required durability, and the mass customisation that is so vital in present day environments where just-in-time and on-demand principles are carried across to manufacturing and functional printing methodologies.

HOW CODING AND MARKING WAS PRODUCED PRE-DIGITAL

The feasibility of producing the standard and usability of marking, prior to the sweeping changes brought about by digital print, required a combination of available processes that might or might not have been technologically driven. Although there were matrices available for producing limited functional, variable information as far back as the 1960s, in general manufacture where durability is a key factor analogue production was relied upon to produce the quality and adhesion necessary for goods to be marked direct or via adhesive label. For example, pad printing's versatility enabled the former of these two principles to be applied across a variety of conventionally awkward surfaces, including non-treated and coated metal finishes, curved and flat glass, plastics and their derivatives and a variety of label stocks of different grammages and compositions. Screen- and flexo printing also provided durability and legibility but long set-up times and slow change-overs negated the possibility of versatility and other kind of versioning or customisation without additional time-consuming pre-production activities.

Computer-generated origination now enables coding, marking and labelling to be applied that match precisely the specifications essential for individual products and can adhere to the printing regulations that are required for EAN and other controlled applications. Optimum control over the entire process comes from the user's desktop and can be incorporated into an end-to-end manufacturing workflow that includes one or more printed elements within, or at the end of, the production cycle.

Digital print also lowers make-ready and change-over times, plus any chemistry that might be contradictory to, and have an adverse affect on, the product being marked depending on its constituents (such as within food and pharmaceutical chains). The other strong advantage for digital production lies in the greater control over volume lengths, as well as the obvious benefits found in VDP and mass customisation.

TYPICAL DIGITAL PRODUCTION PROCESSES

Ink-jet printing uses the same technique as in any graphic or functional environment where droplets are charged and jetted onto the surface of the end substrate. While scanning print-heads are more typical in wide-format printing machines, single-pass arrays utilise a fixed head and are designed to enable high-speed and consistent throughput, both of which have found favour in the industrial and labelling segments. Their static construction can also lead to more compact print and curing units that are easier to accommodate as part of a production line.

Options include continuous ink-jet (CIJ) or drop-on-demand (DOD) where each contains its own series of advantages and disadvantages. The attraction of CIJ within coding and marking lies in the continuous stream of droplets that are generated from an uninterrupted ink flow. DOD technology, either using thermal or piezo-electric print-heads, forces the fluid to jet as required onto the material beneath. While thermal print-head technology maintains its position in some graphic and AEC markets, piezo-electric options are more generous regarding jetting properties and options enabling a broader range of fluid constituents and rheologies. This is because heat is not required to create the pressure that forces the ink through the nozzle. The principle of using a pressure pulse rather than one controlled by high temperature also reduces the likelihood of kogation and blockages.

Digital marking and coding can be generated via ink-jet processes, laser and thermal transfer, with each presenting its own idiosyncrasies and behavioural patterns. Depending on the surface to be marked, the

Continued over

Marking and coding provides identification that might be unique or used to represent the batch to which the product belongs

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Digital marking should match the densities, the quality and the durability of analogue or laser technologies

chosen technology will need to conform to the requirements and the restrictions imposed on the substrate and its ability to accept coding as part of the manufacturing process or as an independent process pre- or post-fabrication or construction.

The principles required whether digital or analogue is employed are that dot and line markings must meet the specified requirements as outlined by the manufacturer of the product, that characters and numbers are fit for purpose, and that the required durability is accommodated. Unless a simple digital methodology where the print itself is either the entire product or a significant part of it (such as with corrugated point-of-purchase stands), marking and coding operations must factor in the necessity that this has to integrate with an overall manufacturing process and progress at the rate required so as not to compromise the rest of the operation.

Analogue production methods were suited to long, unattended runs, but human intervention at change-over required a processing stop or, certainly, a slow-down to enable job parameters to be superseded or modified. Digital inclusion of marking procedures often do not require intervention other than that which be provided remotely or from a convenient work-station placed in a non-disruptive position where required in the workflow and production stream.

THE CHALLENGES FACED BY INK AND SYSTEM DEVELOPERS

Specialist suppliers of digitally engineered and constructed systems for marking and coding applications have had to take into account not only the standards of print necessary to meet the requirements demanded by the products being manufactured or subsequently labelled or presented for identification. They also must be able to match the densities, the quality and the durability that analogue or laser technologies are able to offer and, as well as determining the most efficient ink chemistry for the application of marking and coding, developers have also been faced with the type of UV-curable ink that offers the best performance and durability.

With much primary focus on marking and coding applications tending towards ink-jet equipment, there are associated parts of the printing process that lend themselves to particular technologies that manifest themselves as best suited to this type of process. Because of the methodology adopted by this digital capability there is a natural cross-over between areas where its appropriation is relevant, and this has the benefit of broadening the scope of the ink chemistries employed across industries. The reason for this lies not only in the adhesion criteria but also in the coated and uncoated surfaces that are used in the production of different end products.

The viability of ink-jet printing that can be integrated into a manufacturing process or production line for pre-fabricated products has never been stronger. The growth in awareness for using this type of process in industrial and functional applications is now being recognised as an ingredient that can be amalgamated with success, aided by curing technologies that increasingly are becoming more compact, with greater lamp life and reduced problems relating to high levels of infra-red heat being generated during use. The growth of LED curing has reduced the area required to enclose lamps significantly but its efficacy is reliant on the correct ink type that is receptive to drying at wavelengths within the UV-A spectrum (today most LEDs use 385 or 395nm) to generate satisfactory polymerisation for the liquid to convert from liquid to a solid state.

INK ADHESION AND ITS PROPERTIES

Applications using UV-curable ink-jet technology in the industrial rather than the graphic arts segments of print require different formulations than for display production because their end requirements are not the same. Whereas colour accuracy and visual impact are prerequisites within the wide-format market and some areas of packaging and labelling, where identification is the key principle then the behaviour of the ink chemistry must be tailored to be suitable for use. Ideally it should exceed expectations for the purpose for which is it being applied in order to add extra levels of security and reassurance where printed data is present to serve a specific purpose.

Additionally, the printing system employed must be able to deliver an output parameter which is autonomous in relation to the direction of the code. For example, a barcode printed in either a horizontal or in a vertical direction must carry an identical definition with no deviation or raggedness in its lines that could lead to identification errors at a later stage.

STRINGENT REQUIREMENTS

Given the stringent requirements for effective and durable making methodologies, the ink plays a critical role throughout the process. It

Continued over

Digital technology can either supersede analogue methodology or be used to complement it

A typical code on a consumer product can aid storage patterns, stock rotation and logistics

Inks must provide a crisp, clean finish with no bleed or obfuscation

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is not only vital for maintaining clarity of image quality and text but, also, for the overall longevity and durability of the end product, depending on its final use. Key to meeting these criteria are the properties of the ink wetting on the surface to be printed and the final relationship between fluid and material.

As such, there are important considerations that need to be incorporated into a specific ink type for marking and coding across all sectors. The end chemistry and its associated rheology and viscosity must be factored in with its ability to adhere to a range of surfaces and substrate types, without compromise. Ink must be scuff and scratch resistant and be suited to the performance level demands that are required in exacting conditions that complement the print-head technology employed. Security coding and objects which require long-term marking criteria require an ink that matches critical standards when applied across a range of surfaces and areas.

All inks must provide a crisp, clean finish with no bleed or obfuscation that might obscure the information held in the code or printed data and density is vital in marking and coding applications. But, while its mass when printed must cover the area where the information is being provided, it should never stand proud of the surface, be tacky to touch or leave a rough finish on the marked item's surface.

These considerations are among those criteria which are required in ink chemistries that are used for precision applications that are the pre-requisites for ink-jet technology within the industrial landscape. In addition to their jettability and durability, they must also be capable of working with single-pass print-heads and at very high speeds.

PROCESS RELIABILITY

Crucial in all coding and marking applications is the reliability of the process, whether the methodology is analogue or digital. With the latter procedure, the combination of ink and print-head must be able to be suitable for use as an industrial solution. This means that both the print quality and the ink performance must provide absolutely consistency and constancy over time. This reliability is dependent on the combination of the piezo print-head and the ink performance to result in an industrial solution that generally falls outside production in a clean-room environment. Therefore, reliable jetting performance and very low print-head maintenance are both important criteria for the operator.

Coding and marking extends across many industrial areas but, increasingly, is now a requisite element within the food packaging industry as well as printing direct onto edible produce, such as eggs. On primary food packaging the concerns regarding migration are relatively low, given the very low amount and density of ink being applied. Nonetheless brand owners have become extremely sensitive to this type of print and increasingly demand low migration inks within the food industry, including cartons, cans and bottles used for beverages.

The food packaging industry segment is also dependent increasingly on printed codes that relate to lot numbers and date information for both manufacture and consumption best before and sell-by criteria. This information can be provided by coding and marking procedures that provide printed codes that include latter production stages as part of the overall production detail and specific elements of information.

EU REGULATION 1169/2011

In December 2014 the new EU regulation 1169/2011 came into force that places a regulation on the provision of food information for consumers. This revises the existing legislation that applies to the labelling of food products, defining the requirement for a nutritional table on the packaging with criteria that must include the minimum font size permitted for legibility purposes and the languages suiting a specific demographic and the variation within different geographical regions so that end purchasers are able to understand the information provided. These changes affect late-stage customisation and versioning of packaging in order to comply with the necessary requirements now laid down in an EU directive; digital coding and marking provide a practical and easily managed solution with the benefit of the use of low migrations inks where required.

Low migration inks are also often specified in the pharmaceutical industry where packaging must contain track and trace information as well as branding and, in some examples, ingredients. Blister packaging is now used universally as a preference to physical numerical dispensing of pharmaceutical products into standard bottles or containers and it is vital the coding and marking inks applied do not compromise the items in their intention to provide clear identification of content. Additionally, using a single QR code for each product assists in the trend for serialisation for track and trace in the pharmaceutical packaging sector and can include important data relating to provenance, date of manufacture and recommend life-cycles of the product which, in some cases, can be critical to its efficacy.

As well as within the food and pharmaceutical packaging sectors, there are additional areas where the trend for multiple colours in coding and marking is both desirable and practical. Typical examples are where a specific element of the printed product must stand out and be easily distinguishable from other elements, such as in critical items where definition is advantageous for the human eye. This move away from the sole use of black ink is another area where the benefit of digital coding and marking technologies are able to provide useful and essential differentiators without compromising time and expense when adding colours to printed production run.

Coding and marking are now requisite elements within the food packaging industry

THE FUTURE POTENTIAL

The dynamic that applies to manufacturing practices has changed as demands have digressed from long runs that incorporate common information throughout to lower volumes that incorporate variable data. One of the appeals of ink-jet within the manufacturing sector is its power for producing mass customisation, for minimising job change-over and down-time, the elimination of chemicals and greener working practices, and for its ability to be incorporated as a compact integrated unit within the confines of a production line.

Specialist developers and manufacturers have already accepted the challenges presented by production technologies that now benefit from the integration of digital print. Its incorporation can either supersede analogue methodology or be used to complement it, such as running in tandem to produce customisation on mass production or as a stand-along print technology for low to medium volume applications. Successful growth into the marking and coding segment will be generated by long-standing companies whose understanding of the technologies and the importance of the correct ink formulations have stood them in good stead in the past and will continue so to do in the future.

This extract is from a white paper available via download from http://www.agfagraphics.com/global/en/articles/papers/coding-marking.html ■

Sophie Matthews-Paul is Editorial Consultant at Specialist Printing Worldwide

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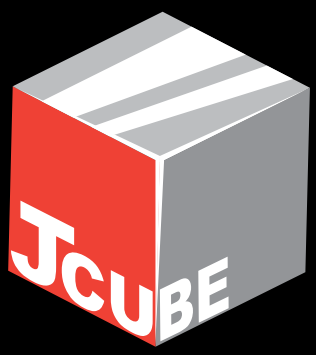

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ACHIEVING POLICY GOALS THAT ARE FIT FOR PURPOSE

Elaine Campling assesses the commitment to 'Better Regulation'

The 'new' European Commission led by Jean-Claude Juncker, as President, is reporting strengthened commitment to 'Better Regulation', in achieving robust policy goals that are fit for purpose. The European Commission plays a pivotal role in proposing legislation for enactment into European Union law by the Council of the European Union and the European Parliament, and for ensuring that it is applied as intended by member countries.

The current Commission was established late 2014, in a process involving both the European Council and the European Parliament. The President of the European Commission and Commissioners (one for each Member State) are elected to preside for a five year term, which will conclude on 31 October 2019 for this Commission. The Commission is supported by an administrative body of approximately 23,000 European civil servants, split into departments termed Directorates-General and Services.

The 'College' of Commissioners has seven Vice-Presidents, each responsible for specific policy areas. The First Vice-President (Frans Timmermans) is responsible for the Better Regulation Agenda, demonstrating commitment to improvement in this area. He is also responsible for upholding the Charter of Fundamental Rights and the Rule of Law in all Commission activities.

THE BETTER REGULATION CHALLENGE

The European Commission is meeting the better regulation challenge through its Regulatory Fitness and Performance Programme (REFIT). The goal of the programme is to reduce regulatory burden, by cutting red tape and simplifying/improving the design and quality of legislation, so that policy objectives are achieved more efficiently. Under REFIT, the Commission is screening the entire stock of EU legislation 'on an ongoing and systematic basis' to identify weaknesses and establish corrective action.

The Commission is committed to strengthening the REFIT Programme and is in the process of establishing a working platform for this purpose. More consultation is planned, not only for new legislation, but also in reviewing existing legislation. Existing policy will be assessed through consultation to see whether it is still fit for purpose, evaluating the impact on specific sectors to identify unintended consequences and where improvements are needed.

The platform will be composed of two groups, Member State experts, so called the 'government group,' and the other of representatives from the European Economic and Social Committee (EESC), the Committee of the Regions (CoR), business, social partners and civil society organisations having direct experience in the application of Union legislation, the 'stakeholder group'.

NOMINATED EXPERTS

The EESC and CoR will each nominate an expert to the group. The remaining stakeholder members will be decided from evaluation of applications, following a Commission announcement calling for expressions of interest. Members will be appointed for the duration of the Platform mandate i.e. the Commission term to 31 October 2019. The First Vice-President will chair the Platform and preside over an annual joint meeting.

The platform will canvas, evaluate and develop robust proposals to reduce regulatory and administrative burden arising from Union legislation and its implementation in Member States, taking into account the particular impact on micro, small and medium sized enterprises (SMEs). The Commission services may consult the platform on any matter relating to its better regulation work and the REFIT Programme.

Aside from responding to public consultations, individuals and groups can comment via the submission of suggestions/comments via a web system, set up for this purpose:

http://ec.europa.eu/smart-regulation/refit/simplification/consultation/consultation_en.htm#up

The dialogue is available for public viewing, and going forward is expected to include more extensive commentary from the Commission services or Member State concerned.

The Commission Work Programme for 2015 has already been decided to include the REFIT actions planned for the year. On this, the Commission reports withdrawal of a number of pending legislative proposals from previous Commissions that were not in keeping with the new political priorities.

A number of Better Regulation successes are being reported by the Commission and include legislation affecting the chemical sector. On REACH, the Commission is reviewing measures to reduce costs related to the compilation, communication and use of extended safety data sheets.

European Union legislative process and the mechanisms involved is complex in itself and often misunderstood, despite legislation being key to the health, safety and welfare of global citizens and the sustainability of our global environment. To be effective, legislation should be proportionate and fit for purpose. Instead, it is often over complicated, over burdensome and subject to gold-plating, both in its introduction and transposition into secondary regulation via national implementation.

For this reason, it is important to support 'Better Regulation' initiatives, to submit informed comments/suggestions via the consultation process and on line system. ESMA's Health, Safety and Environmental Protection (HSEP) Committee members have made representation, both individually and collectively as ESMA on a number of key regulatory topics. For example, on information disclosure to poison centres, multi-language labelling, and the issue of empty pictograms on labels, in relation to the CLP Regulation.

Representation has also been made (several occasions) on the Seveso Directive because it is not risk based and results in unnecessary burden for industry. No significant benefit can be claimed from the recent revision and it can only be hoped that future revision will result in something more practical, which is proportionate and risk based. To achieve this, industry must organise itself collectively to challenge the existing frame-work, not only on Seveso, but on all legislative problematic areas. We have improved mechanisms to do this under the current Commission and should not waste the opportunities that this provides. ■

Elaine Campling is Chairman of ESMA's Health, Safety and Environmental Protection Committee and Product Safety Manager for Fujifilm Specialty Ink Systems

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Driving Print Excellence

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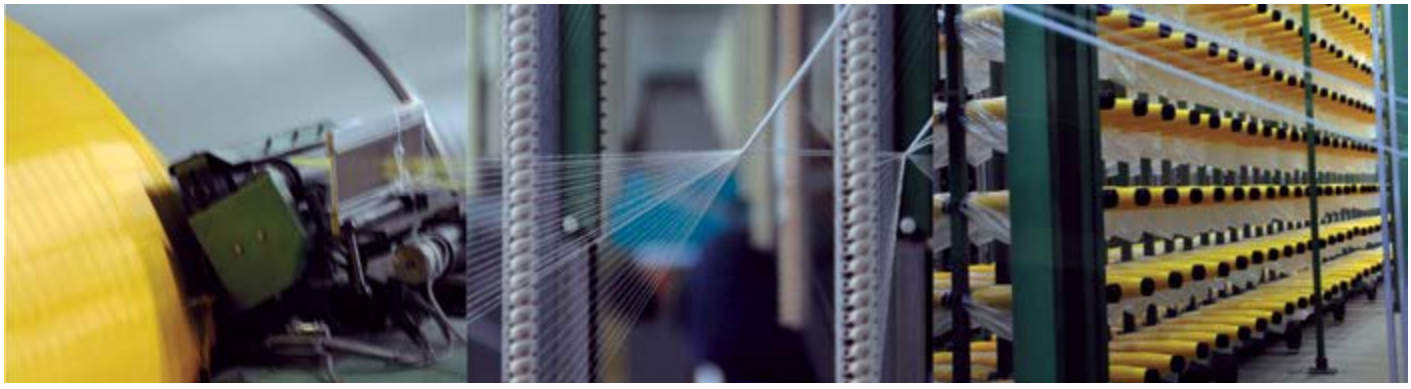

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TACKLING THE CHALLENGES

Screen-printing press replicates out-of-register look

When Robert Bailey started his own clothing line, he had no idea that his lack of screen-printing knowledge and funds would actually work to his advantage. With only $400 to his name, Bailey spent every penny on tank tops and started printing them with an old manual screen-printing press that had been sitting idle in his garage.

"I went with the hand-printing process because I didn't have enough money to buy an automatic press," he explains. "The press was so old that the pallets were warped, and it wouldn't register properly, so the ink was positioned differently on every shirt."

Despite the press's shortcomings, Rob Bailey found a beauty in creating limited one-of-kind prints that soon became the mainstay of his brand. "I had no idea what I was doing when I started the business," he says. "I didn't know, for example, that when you lay down two colours you don't want to lay prints over each other because you're going to have bumps and different opacities based on the ink you're using." As a result, he printed hand-script fonts over large block fonts and ended up with what looked like graffiti. "It gave a cool element to the shirts," he adds.

But the machine's damaged pallets and lack of registration also caused him financial hardship. "It was great that this 'controlled chaos' allowed me to capture a creative angle for the brand, but it was affecting my bottom line," he admits. "I had to reject about 25% of my product because the press was so poor."

The Vastex manual press accommodates oversize pallets for jobs such as banners

RETAINING CREATIVITY AND BOOSTING PRODUCTIVITY

With social media outlets as his only source of marketing, Bailey's business, Flag nor Fail, soon went viral, growing at an astounding rate of 20% a month. His shop quickly outgrew the confines of his garage, so he moved into a warehouse, hired two employees, and started looking for a new printing press. His Internet search led him to Vastex in Allentown, Pennsylvania.

"Going to the showroom sealed the deal for me," states Bailey. He purchased an eight-colour/eight-station V2000HD manual press. "The screen adjustment, the hardware, the hydraulic lift instead of springs, the heavy-duty construction – I can tell I'll have this forever."

Unlike Bailey's previous press, the V2000HD has metal pallets so he doesn't have to worry about warping. "With the original four-colour/four-station press, I had to skip one of the stations because it was so warped," he says. Now, with a total of eight stations and all-heads-down capability, he has two people printing different jobs on press at the same time – one on each side of the machine. With all-heads-down printing capability, each pallet can serve as a single-colour print station, allowing multiple operators to work on the press at their own pace.

While the faulty registration of Bailey's original press helped create his brand, the accurate registration of his V2000HD press simulates faulty registration with garment-to-garment consistency.

"The screens are on hinges and, when they come down, they lock in the registration

Continued over

Tim Hauck and Dustin Mitchell apply ink to the screen, as Rob Bailey draws the squeegee.

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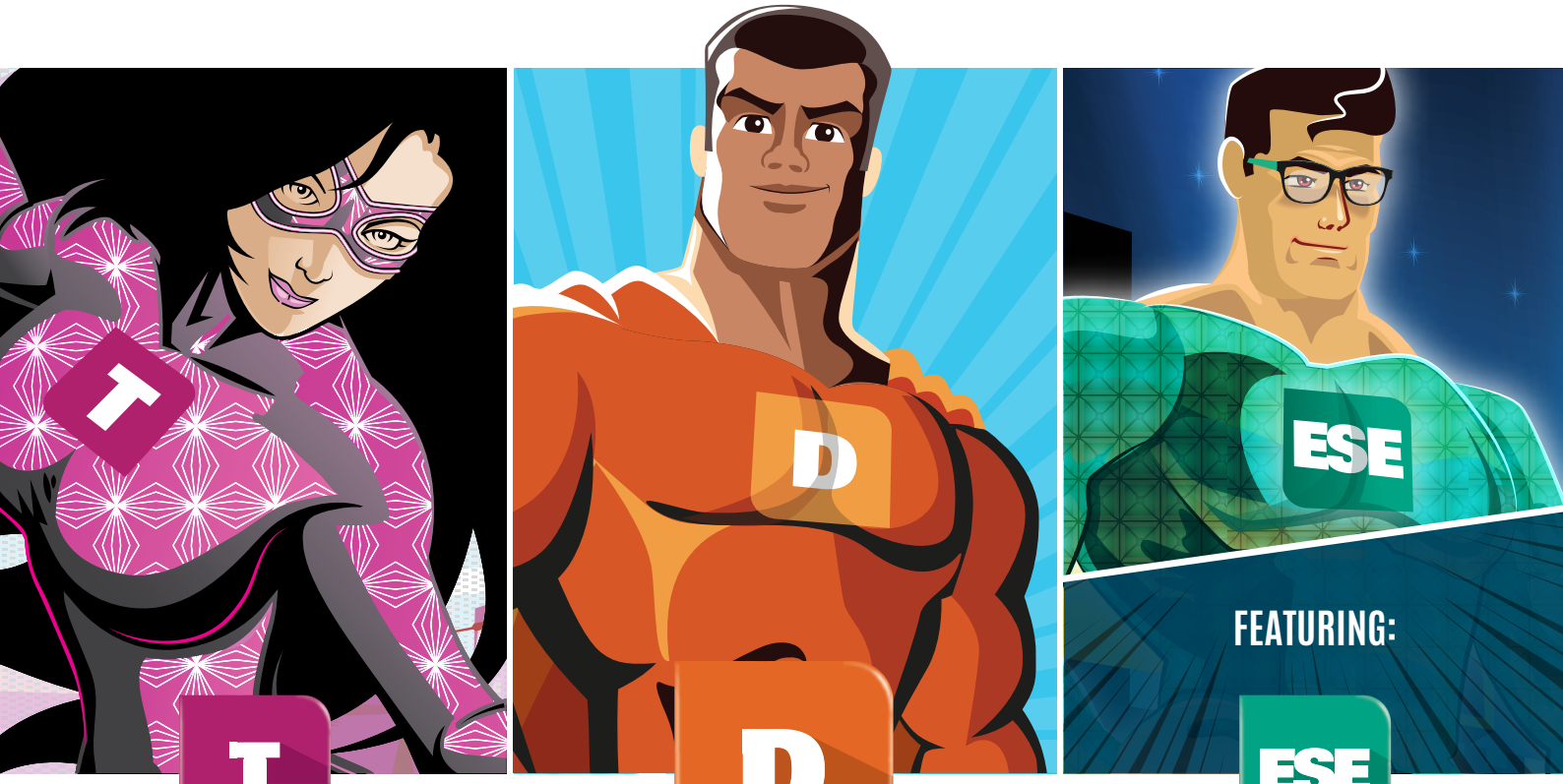

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The V2000HD manual press enables all-heads-down printing with two people working on different jobs

before they touch the pallet," explains Bailey. "The machine is constructed so that all eight screens can come down at the same time, and the registration's always on for all of them."

The press's micro-registration knobs also allow Bailey to adjust the print-head incrementally for repeatable accuracy. "I rarely have to use the micro registration," he insists. "But when I do it's easy. With other machines, you'll get a thousand shirts in, and your registration will start to slide off a little bit. We use this machine's micro-registration to finalise the line-up, and then it never goes off after that."

ACCOMMODATING DIVERSE PRODUCTS

One of Bailey's more challenging jobs is printing text over zippers and pockets on hoodies. "It was difficult to print on the old machine because the ink would pool up on either side of the zipper, and in other places the ink didn't hit as much," he says. Now, he can print hooded sweatshirts with ease while still retaining the garment's unique, hand-printed appearance.

"Last winter we did tons of hoodies, and people responded really well because there's nothing like that on the market," states Bailey. "Everything you get in the stores is so clean because they use an automatic press, but no one is printing 'dirty-looking' fronts. It's more like art on a shirt."

When Bailey started printing 0.6 x 1.5m banners, he thought he would have to invest in a different machine. But Vastex built a 0.9 x 1.5 m pallet to accommodate the banners on his current press. "On any other press, it would be too much stress because the screens are made of heavy two-by-fours," explains Bailey. "But the Vastex machine handles the weight of a 0.9 x 1.5 m pallet and a 0.9 x 1.5 m screen."

Bailey also purchased a Vastex EconoRed II infra-red dryer with a 76cm belt and dual chambers. By adjusting the belt-to-heater height, he can accommodate bulky items, such as hooded sweatshirts – yet do so in a smaller footprint

After moving into the warehouse, Bailey bought a second EconoRed II dryer and a four-colour/four-station V2000HD press. One month later, he repeated the same order for a four-colour/four-station V2000HD and an EconoRed II dryer.

Now, he can print girls' tank tops on the four-colour/four-station V2000HD, guys' shirts on the eight-colour/eight-station V2000HD, and specialtiy items on the second four-colour/four-station V2000HD. "It's nice because I don't have to change out pallets," he says.

Rob Bailey micro-registers the press for repeatable accuracy.

PRESS AFFORDS PEACE OF MIND

With catch phrases, such as: "Work is in my blood" and "Never settle" Bailey's T-Shirts and tank tops reflect his work ethic. He and his wife, Dana Linn, have attracted an international following, and travel to gyms and fitness events worldwide to spread their message.

Business is booming and once again Bailey is moving into a larger warehouse. In addition to housing the print shop, the new warehouse will have a car shop, a private training gym, and a recording studio. Bailey plans to hire a print manager and purchase another four-colour/four-station V2000HD press to keep up with the demand for T-Shirts promoting his new business ventures.

But Flag nor Fail's phenomenal growth is not without challenges, concludes Bailey: "The more the business grows the more problems arise. I'm having problems with the buildings I'm renting, the work vehicles, the computers, the staff, the bank – everything except the presses." ■

Rob Bailey, sitting on a pallet, demonstrates the weight capacity of his Vastex press

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A PORTFOLIO OF MODERN INNOVATIVE PRODUCTS

Research and development pays dividends in emulsion improvements

As a manufacturer of chemical products for textile printing screen production, ARC – Albert Rose Chemicals is a key partner for textile printers and commission engravers worldwide. Since the early 1990s, ARC has operated as one of the business units of Kissel + Wolf GmbH, benefiting from the comprehensive facilities for research and development, application technology and production. All activities are based in Wiesloch, near Heidelberg, Germany.

Continuous improvement of the system chemistry for textile screen engraving has always been a basic precept for ARC. Constant development and product improvement to promote environmental protection, occupational safety and user-friendliness, have enabled the laboratory staff of ARC to develop modern and innovative products. These will be presented at ITMA 2015 on Stand C 106, Hall 18.

CHROME FREE EMULSIONS FOR ROTARY SCREEN-PRINTING

Chromium sensitisers are used to sensitise rotary emulsions for exposure and as a bonding enhancer for laser engraving. Because it is a genotoxic carcinogen, chromium (VI) and chromium-dichromate were listed relatively early on the European Chemical Agency (ECHA) candidates list as 'Substances of Very High Concern' (SVHC) in the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) regulations. For this reason, from September 2017, without prior authorisation, no more products can be manufactured which contain chromium (VI) or requiring this hazardous material for application and processing by a customer.

The challenge to find substitutes for chrome sensitisers has been met by Albert Rose Chemicals. Thanks to its dedication to continuous research and development, ARC can now present a full range of functional substitution products that make the addition of chromium (VI) and dichromate unnecessary to sensitise rotary emulsions. These replacement products have not only enabled the development of rotary emulsions, which have increased storage stability – but also feature all the advantages of a modern photoemulsion or laser lacquer for every coating, exposure and laser engraving process, which is used in the production of rotary printing screens for textile and wallpaper printing.

PARTICULAR RECOMMENDATIONS

The following innovative, chrome free ARC rotary emulsions and lacquers are particularly recommended:

- Chrome free, one-component laser lacquers Arcalack L-B New/L-F New/ L-R New for the engraving of rotary screens with good ablation properties during engraving, detail reproduction by CO_2 ablation lasers and proven resistance in the textile and wallpaper printing. Available in different colorations: Arcalack L-B New = Blue/L-R New = Red/L-F New = Colourless
- Highly-viscous, single-component laser lacquer Arcalack 220 Red for the production of screens with high open areas, as well as of elastic thick film screens for haptic print results using a CO_2 ablation laser, especially in wallpaper printing
- Diazo sensitised, universally applicable photo emulsions Arcagel 125 D Blue or Arcagel 130 D Red for conventional film exposure, wax or ink-jet. Can be also used as laser lacquer without sensitisation
- Diazo sensitised photo emulsions Arcagel 100 D-CTS Blue or Arcagel 101 D Red for DLE exposure using DMD LED, Blue-Ray laser or LED diodes, but also for conventional film, wax or ink-jet exposure
- One-component, pre-sensitised SBQ emulsions Rotacoat 325 Q Blue, Rotacoat 326 Q Red or Rotacoat 330 Q-CTS for DLE exposure, but also for conventional film, wax or ink-jet exposure

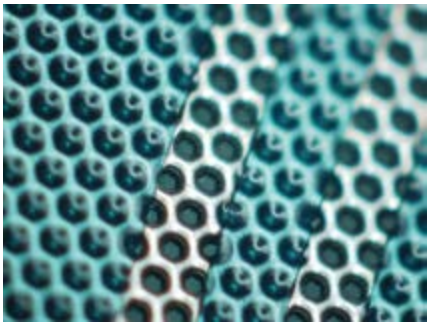
MODERN EMULSIONS FOR FLAT SCREEN-PRINTING

For the conventional engraving of flat stencils, ARC presents the proven diazo sensitised photo emulsions of the Texsol series, which can be chemically hardened with Kiwoset products to achieve very long printing runs. Particularly recommended is Texsol 600 Eco – the world's first photoemulsion that meets the criteria of the global Öko-Tex Standard 100 and has been certified with Eco Passport.

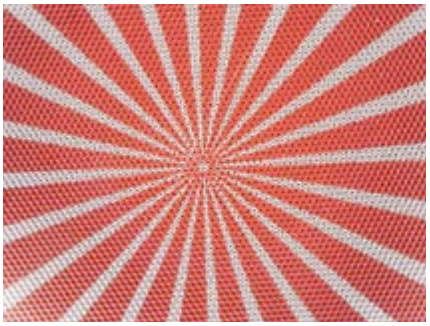
One-component SBQ emulsions of the Polytex series are suitable for the production of large flat screens. Because of its high light sensitivity, the emulsions of the Polytex series are ideally suitable for direct projection and DMD systems as well as wax or ink-jet systems. The preferred area of application is the production of flat screens for banners, flags and umbrellas.

ADHESIVES IN DIGITAL TEXTILE PRINTING

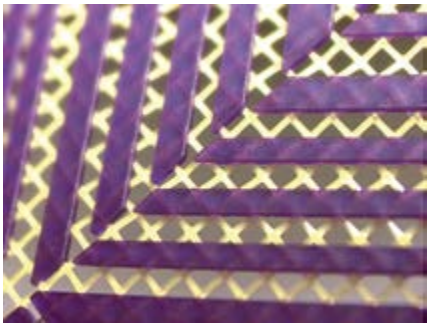
In addition to the well-established Kiwotex permanent and thermoplastic adhesives (Kiwotex DK- and Kiwotex TDK- series), ARC offers its newest innovation Kiwotex Digital – a permanent adhesive for fixing goods during digital textile printing. The permanent adhesive surface allows repeated continuous adhesion of printed fabrics. ■



Arcagel 125 D Blue is a chrome free emulsion for conventional film exposure, wax or ink-jet



Arcalack 220 Red is a chrome free emulsion for the production of screens with high open areas as well as of elastic thick film screens



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"FORWARD THINKING IS OUR FORTÉ"

Andreas Weber interviews Oliver Zünd

For more than 30 years, the Zünd name has stood for Swiss quality, dependability, technical superiority, and exceptional customer value. Because of their speed, intelligent tool control and automatic material-handling, Zünd cutters have evolved into high-performance production systems. Close and long-standing relationships with innovative regional suppliers guarantee consistent, high-quality workmanship. Just-in-time delivery from suppliers is a key factor in Zünd's ability to maintain flexibility and efficiency in the final assembly of its products. Quality-control systems throughout all phases of production enable the company to produce first-rate equipment known for its precision, reliability, and longevity.

In 1984, the company's early days, Karl Zünd began distributing Wild flat-bed cutters. Within two years, he had recruited a number of engineers to help develop new tool heads and other add-ons, such as an automatic advance mechanism for rolled materials. Five years later, he brought the first Zünd plotter, the P-1200, to market. Multifunctional tool heads and a systematic pursuit of modularity formed the basis of Zünd's diversification strategy and, to this day, continue to provide the gateway to many new opportunities.

Today Zünd is the leading supplier of flat-bed cutters to the graphics industry worldwide, a close second in packaging. In the composites, leather, and textile industries as well, Zünd is one of the world's leading suppliers of digital cutting systems. Oliver Zünd sums it up: "These days we are virtually surrounded by products that come off our cutters – products that at some stage have been cut, routed, or scored with Zünd equipment.

SECOND GENERATION

Now in its second generation, the company has 240 employees and is run by Oliver Zünd, while Karl Zünd maintains his leadership role in strategic planning, ensuring Zünd's continuity in maintaining local roots while exerting global influence. He will continue to actively participate in management and preside over the company's board of directors.

Numerous technological milestones punctuate the history of the Swiss, family-owned business. Following the 1989 launch of the first Zünd cutter, the P-1200, Zünd introduced the first modular tool heads in 1992, which opens up an entirely new range of applications. With the M-line, Zünd introduced the second cutter generation in 1995. With the introduction of the LC-2400 in 1999, Zünd drew a lot of attention from within the leather industry. The Zünd G3, the company's flagship and third cutter generation, was brought to market in 2008. The development and expansion of the G3 series has been continual, making the system more and more adaptable to specific market requirements. With the introduction of Zünd Cut Center ZCC in 2010, Zünd set a new standard in digital cutting software. The following year, it launched its Board Handling System BHS, a fully automated material-handling system. In 2012 Zünd further expanded its product palette with the S3, an

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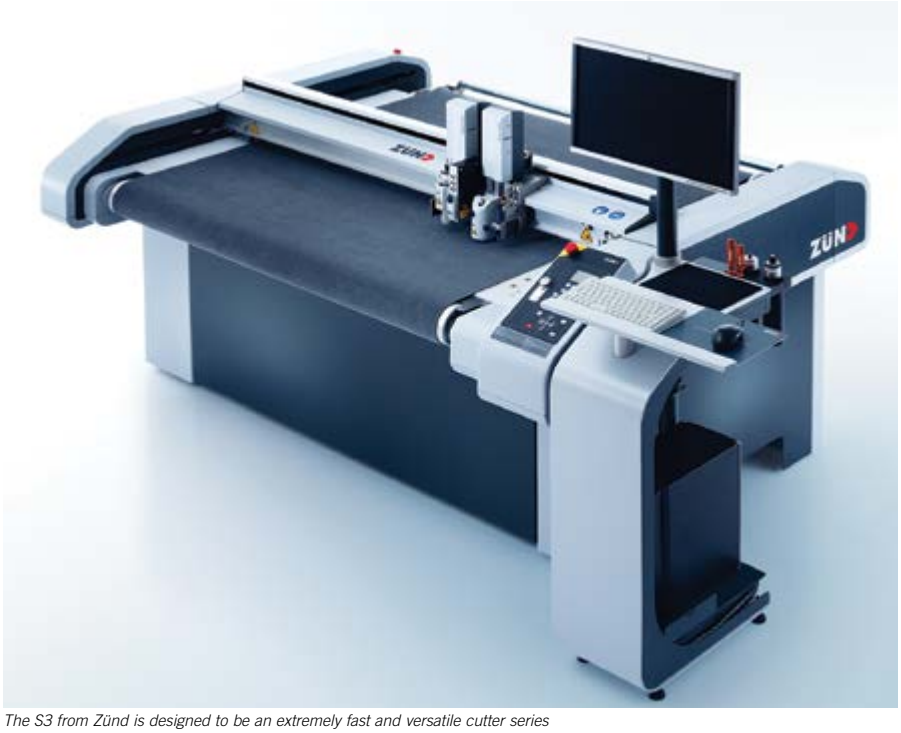
Zünd's head-quarters in Altstätten, Switzerland



The S3 from Zünd is designed to be an extremely fast and versatile cutter series

extremely fast and versatile cutter series. The latest milestone has been set in 2015, with the successful introduction of the Zünd L3 cutter for the leather industry.

CONTINUAL GLOBAL EXPANSION

Zünd's company history is also marked by continual global expansion. Zünd Asia Ltd., the first foreign subsidiary, was established in Hongkong in 1998. With Zund America, Inc, Zünd established direct representation in the North American market in 2004. In 2012 it expanded into India, with Zund India Pvt in Bangalore. The following year, the company took over its long-standing distributor in the Netherlands and established Zund Benelux BV, while Zund Italia Srl was founded in 2014 in Valbrembo, Italy.

ANDREAS WEBER: Why has the history of Zünd Systemtechnik AG become such a success story?

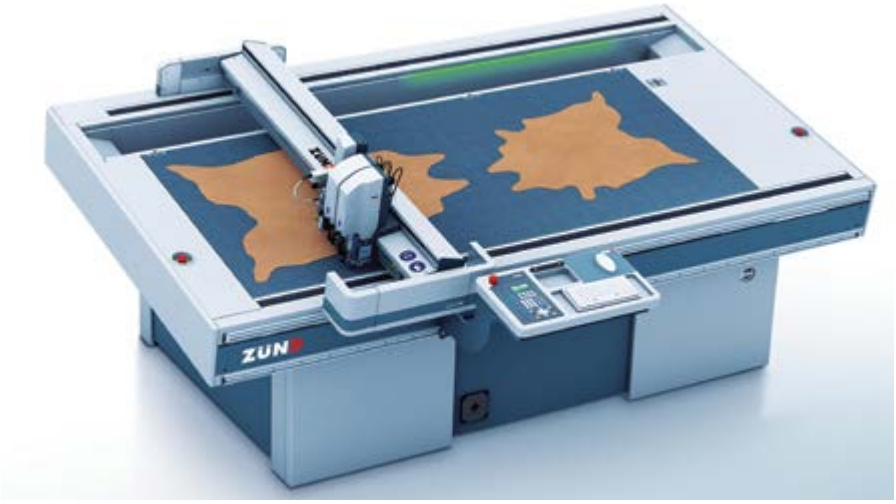
OLIVER ZÜND: What really distinguishes us – our true forté – is "thinking forward", that is, focusing on long-term strategies rather than short-term, quarterly goals. This gives us a great deal more flexibility and is something we, as a family business established in 1984, are in a position to do. Of great importance to us are the close relationships we have established with our customers and our many regional ties. 80 percent of all Zünd machine components originate within a 30-kilometer radius of our factory. We are also very focused. We know exactly what our strengths are and have specialised in developing a solid, modular cutting platform that serves vertical and highly specialised markets. The advantages are twofold – first, there is better risk management on our part and, second, customers benefit in their ability to upgrade and expand their systems as needed.

AW: What are your sources of inspiration for further company expansion and product development?

OZ: We rely on a very well-educated workforce and have an R&D staff of more than 40 employees. For a company of our size, this represents an unusually high ratio. Our strategy is to stay in close contact to our markets so we can react as nimbly as possible to any changes. This means that our business has to involve direct customer contact wherever possible, which is why we serve the D-A-CH (Germany-Austria-Switzerland) region directly from our headquarters in Altstätten, Switzerland. This allows us to remain very close to end-users. Our steady involvement in numerous industry tradeshows also helps us stay on top of different markets and developing trends.

AW: Can you cite an example?

OZ: A good example is FESPA, which took place in May 2015 in Cologne, Germany. We were able to present to an international audience a variety of brand-new automation solutions. We introduced a state-of-the-art picking robot, which will be available in Q4. In addition, we showed the new Automatic Router Bit Changer – ARC. This feature automatically selects the correct router bit based on the material at hand, which significantly decreases set-up time and reduces the potential for operator error. Our main focus at these tradeshows is the direct contact and dialog with our end-users.



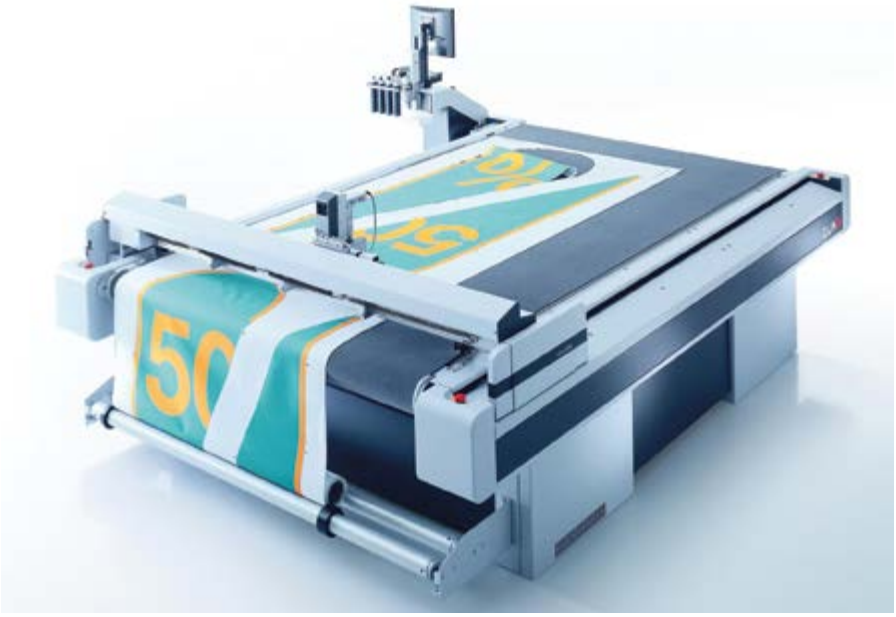
Zünd's L3 is designed for the leather industry

AW: How do you gauge the relevance of your products and solutions, particularly in terms of innovation and customer/market value?

OZ: When it comes to new product developments, we try to work wherever possible with beta customers in close proximity. This is how we test features, such as the picking robot, and optimise them as necessary for real-life production environments. For customers at greater distances – now more than 6,000 in 113 countries – we make sure they have continuous support throughout the product life-cycle. We continually gather and evaluate customer feedback, so that in principal, we are able to capture and implement relevant suggestions in a maximum of twelve months.

AW: What is your take on the general state of printing in the digital age, as it pertains to your customers?

OZ: In our view, digital printing continues to have a great deal of potential; however, competition among production houses will no doubt continue to rise as printing volumes get redistributed. Because of the continued trend towards digital, the structure of print jobs changes, especially in terms of volume per job, which is steadily decreasing as orders become more customised. This benefits us as well as our customers, of course, since it fuels the need for digital cutting, particularly in conjunction with increased print



The Zünd G3 is the company's flagship and third cutter generation

Zund America, Inc was established in 2004 in Franklin/ Milwaukee (WI). Since then the USA corporation has grown from five employees and 10,000 square ft to more than 50, occupying a total of 24,000 square ft of demonstration, service, office, and warehouse space. Zund America supports thousands of customers all over the USA and Canada in the graphics, packaging, leather, textiles, composites, manufacturing, and other industries that rely on Zünd cutters for precise, efficient digital cutting.

Zund America's pre-installation trainers, application and consumables specialists, as well as the team of factory-certified technicians, all have one goal in mind. That is to make certain every Zünd cutter they install – and the production facility that depends on it – is operating at maximum productivity.

Zund America is grateful to have so many customers in such diverse industries operating at the cutting edge of innovation. Because of the invaluable relationships established over the years, many ground-breaking improvements in digital cutting system and workflow efficiencies have been a direct result of customer feedback – expertly implemented by Zünd Systemtechnik.

Zund America is located in Franklin, Wisconsin, 15 minutes from the Milwaukee airport. Milwaukee, situated on the western shore of Lake Michigan in the central United States, is easily accessible, just 90 miles north of Chicago. The city is known for its many summer festivals, but with such popular attractions as Harley Davidson, Miller Brewing Company, and the Milwaukee Art Museum, it has something to offer year round.

ZÜND AT SGIA 2015 – ATLANTA (BOOTH 4045), 4 TO 6 NOVEMBER

With the G3/S3 lines of multi-functional flat-bed cutters, Zünd offers a full range of digital finishing solutions for custom to high-volume production environments involving rigid and/or flexible substrates up to 2 inches (with extended beam height up to 4 inches) thick and 10 feet wide.

Zünd Cut Center, Zünd's end-to-end digital workflow suite, ensures simple, efficient operation and unsurpassed productivity. With Zünd Total Automation, file retrieval occurs automatically via touch-free QR-code capture, which results in a fully automated digital production workflow. This allows for 100% non-stop production, such as with cutter configurations including automatic sheet feeder and robotic off-load, or larger machines set up for tandem operation, where cutting alternates with loading/unloading on each half of the cutting area; as well as with roll-fed systems.

customisation. From our standpoint, the best PSPs know how to find new customers for digital printing and can thereby establish new markets, especially through the use of new materials. They manage to distinguish themselves from the crowd through new applications and the use of our high-performance cutting systems.

AW: What would you be doing if you weren't involved in digital cutting?
OZ: Something completely different, most likely related to some kind of sport that would take me around the world. I'm very happy with the way things are though, since no sport allows you to grow old. ■

Andreas Weber is Founder & CEO at Value Communication AG

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Two new appointments at Ultraflex

Matt Loede

Dan Hall

Ultraflex Systems Inc has promoted Matt Loede to Director of Marketing and Product Development and Dan Hall to the position of Southwest Territory Sales Manager.

Having begun his career at the company as a marketing intern, Ultraflex says Loede's hard work and dedication proved to further his career and he was promoted to the Inside Sales Representative and then Territory Manager for the fast-paced Eastern Sales Territory. Loede was then appointed Product Marketing Manager and ultimately Director of Product Development where he successfully launched 50 new products in four years, filling niche markets and catapulting Ultraflex to be an industry leader.

The digital print experience and product knowledge that Loede has achieved, combined with his ability to advise customers to realise their application needs, have proven to be the perfect combination, states the company. In his new position, he will marry the areas of marketing and product development to enhance sales with new product offerings and collateral materials.

Ultraflex has also appointed Dan Hall as the new Southwest Territory Sales Manager who joins the Ultraflex sales team with a 20 year background in the printing and graphics industry. His degree in Biology from the University of Texas combines with his knowledge of offset and digital print, PVC materials, paper, fabrics and fabric welding, to allow him to provide a full-service experience for his customers. His expertise has proven to guide clients through the printing process from product selection, printing, finishing and installation. ■

Bottle printing made simple with Azon's Rotax

New from Azon is its Rotax for bottle printing on its UV-curable A3 and A1 and B0 Indy machines. The company says this innovation enables 360 degree printing on a wide range of materials., and the possibilities of digital printing have now been doubled with specially designed rotary adapter.

Rotax allows printing onto a vast range of cylindrical objects with diameters ranging from 41 to 127mm and heights up to 279mm. With the new rotary adapter it is possible to print more varied applications including cylindrical and conical objects such as beer and wine glasses, cups, candles, tube, cans, tanks, vases, awards and much more.

The new Rotax makes cylindrical printing efficient and precise by delivering both white and full colour prints. The attachment is easy to install, quick to mount and smooth to operate, and takes only two minutes to plug and play. Operators simply mount the adapter onto the printer and insert a connector. Among its features are user-friendly settings and functions, simple installation steps, plus intuitive and easy operation. ■

Azon's new bottle printing attachment

New hybrid varnish for the automotive industry

Marabu states that its Mara Cure HY hybrid varnish meets growing demand for an exceptionally high-quality finish, and customisation options, particularly in the automotive industry. It combines the advantages of solvent-based and UV-curable coatings, delivering exceptional versatility, flexibility and durability.

IMD (in-mould decoration) or FIM (film insert moulding) processes require a high degree of temperature resistance and flexibility. In addition, the final product must be extremely durable and resistant to chemicals. Mara Cure HY is a mouldable, and abrasion- and chemical-resistant dual-cure screen-printing varnish. It can also be used as a protective hard-coat for films made from PC, PMMA or ABS, which are more susceptible to abrasion.

A state-of-the-art, cost-effective alternative to conventional film coating, Mara Cure HY is suitable for all IMD processes on substrates commonly used in the automotive industry. The hybrid varnish is ideal for automotive interiors and exteriors, and for indoor and outdoor applications, such as furniture coatings. Mara Cure HY is highly reactive, and provides the flexibility needed in downstream processes, including moulding (before UV curing), punching, cutting, and back injection moulding (after UV curing).

The versatile varnish is available in 1kg containers and allows varying degrees of glossiness. For example, the high-gloss product creates eye-catching glossy effects on matt film surfaces. In turn, the satin-gloss product achieves a compelling matt contrast to glossy films. Mara Cure HY films display exceptional elasticity, ensuring outstanding mouldability. Furthermore, the varnish is highly transparent and meets all standard automotive industry tests, including sunscreen (GMW 14445) and mechanical resistance (in accordance with Oesterle DBL 9202). ■

Marabu's new Mara Cure HY hybrid varnish

Nazdar appoints Spandex company OTS as Turkish distributor for wide-format ink sector

Nazdar Ink Technologies has appointed OTS as a distributor for its wide-format ink solutions within the Turkish market. Nazdar is well-known as the manufacturer of one of the most comprehensive ranges of UV, water-based and solvent-based wide-format digital inkjet, screen-printing and flexographic inks. OTS (a Spandex company) is an established specialist provider of hardware, consumables and support services to the Turkish signage, graphics and textile printing community.

Established more than 35 years ago, OTS has recorded significant growth in recent years under the leadership of General Manager Onur Öz. The company operates with a team of 32 employees from its head office in Ankara and branch office in Istanbul and serves a nationwide customer base.

Under the new agreement, OTS will focus on delivering Nazdar's high quality alternative inks to customers in the wide-format printing industry, specifically those with Roland DG, Mimaki and Mutoh printers.

On the appointment, Onur Öz comments: "We are pleased to confirm that we are partnering with Nazdar Ink Technologies. The relationship with Nazdar enables us to become a stronger company in the important growth market for wide format digital inks, and opens the door for OTS to gain an active presence in this sector and the ability to provide high-quality inks to its customers. OTS is now better enabled to support its customers more effectively for their ink needs." ■

OTS will focus on alternative inks for wide-format printing

Ring becomes VP Worldwide Sales & Marketing Digital Solutions at Gallus

Michael Ring

As of mid-August 2015, Michael V Ring has joined the Gallus Group as Vice President, Worldwide Sales & Marketing Digital Solutions. He is a proven executive with 27 years of experience in digital printing and will strengthen the company's expertise in the digital label market. Ring will be responsible for worldwide sales and marketing activities for the new DCS 340 digital label converting line. This underlines the company's direction to expand in this market segment.

From 2007 to 2014, Ring worked at Xeikon America, first as Chief Marketing Officer & Vice President of Sales North America and then as President North America, in addition to being Vice President Worldwide Marketing at Xeikon NV. Prior to Xeikon, he has held several key positions with various companies such as Kodak and Xerox.

According to Klaus Bachstein, CEO of Gallus: "The combination of Michael's extensive knowledge in digital printing and his proven track record of successfully developing and positioning digital printing technology will bring a lot of benefits into our organisation and will make Gallus's solution offering to our customers clearly better. The build-up of our digital expert team is on track and we are thereby continuously expanding our competence in digital converting."

"Gallus is known for its leadership in the label and packaging markets. Being part of a team that will bring the next generation of digital technology and redefine the benchmark for digital in this space is incredibly exciting," adds Ring.

Ring will be employed at Gallus Inc., USA and will work out of Philadelphia and St.Gallen, Switzerland, reporting to Christof Naier who is VP Sales & Services. ■

New emulsion for high end fashion textiles

New from CPS, global manufacturer of safer screen-printing products, is a new photostencil emulsion specifically developed to meet the needs of high end fashion textile printers. Designated CPS Ultra Coat Triton, it creates a highly durable stencil ideal for discharge, water and plastisol inks.

The new emulsion has been formulated to offer consistency, speed, ease of application and high durability for printed goods requiring a soft and natural feel. With global per capita consumption of high-end textiles expected to grow by 2020, the new emulsion is part of the portfolio developed by CPS to increase its already well-established presence in this market.

Simon Jones, Commercial Manager CPS, says: "We have developed this latest emulsion to be resistant to discharge inks, as these are widely used for high fashion textiles in order to offer outstanding colour rendering. However, discharge inks tend to be aggressive to the stencil so CPS Ultra Coat Triton has been formulated to perform at an optimal level, even in these extreme conditions, and particularly on the latest direct-to-screen systems which are being used on the market today."

Developed with cutting edge technology in mind and with in-built versatility, CPS Ultra Coat Triton allows printers to keep up to speed with the latest industry developments with just one emulsion. Its high solid content provides excellent coating on coarse mesh avoiding the need for retouching. For most applications only 1+1 coats will be required, even on poorly prepared screens, and after printing it can be easily decoated.

CPS Ultra Coat Triton is optimised for any print run, with versatility and outstanding performance and is claimed as a great new addition to the CPS range of screen-printing chemicals for the textile industry. ■

CPS Ultra Coat Triton is ideal for discharge, water and plastisol inks

NPI reduces energy costs and increases production with Phoseon's FireJet

NPI is a leading printing and product identification company ranging from decals, labels, digital prints and fleet materials to fabrication, nameplate and metal items. As a result of integrating UV LED curing technology from Phoseon, it has been able to reduce energy consumption by replacing traditional dryers and, since UV LED cures faster than the traditional options, NPI has also increased its production capacity.

NPI brand products include decals, screen-printed on vinyls, Lexan and polyesters, transportation branding and markings, digitally printed on 3M speciality vinyls, plus tradeshow and outdoor displays and banners, digitally printed on large-area vinyl displays

Phoseon's compact UV LED curing light sources offer advanced capability and increased production speeds. The LEDs are instant on/off, so the UV is only on when ink curing has to occur. This saves energy and increases the life of the unit even further. UV LED curing is proving to be the ideal choice for high-resolution printing on a wide variety of substrates. LED (light emitting diode) technology offers maximum UV output with significantly less energy consumption, along with cooler operating temperatures that allow for printing on heat sensitive substrates.

The small size of the light sources makes them ideal for machines with limited space. It also allows for printing on heat-sensitive substrates and ever-thinner labels. These solutions enable users to process a variety of materials at maximum production speeds, with low-input power requirements.

FireJet FJ200 in use at NPI is a high-capability air-cooled UV LED curing light source, capable of curing at the highest speeds for a variety of printing applications. ■

Trotec unveils its Speedy 360

Trotec has introduced the newest member of the Speedy product line which hosts new features including a brand new high-accuracy focus mode, an enhanced working area designed for optimisation and to accommodate standardised material sizes, and a multifunctional table design.

With a working area of 32 x 20 inches, the Speedy 360 was developed to accommodate more standard material sizes. This saves time and money because there is no need to pre-cut materials. In addition, it is is designed to increase production capacitiy by processing at maximum speed of 140 inches/sec.

In addition to the optimised working area, the new model includes features such as LED lighting for uniform illumination of the working area, and the organised machine cabinet to increase efficiency. The new design does not include front bars, making it easier and faster to load and unload heavy and bulky parts.

With the launch of the Speedy 360, Trotec introduces a new patented focus mode called The Sonar Technology. Easy to use and efficient, this focus mode works with ultrasonic sensors and provides highest focusing accuracy, guaranteeing a higher quality of the application.

The Speedy 360 includes a multi-functional table concept in which various different tables can be inserted to process a wide array of materials and applications. It is is also available with a CO2 laser, a fibre laser or with Trotec's flexx option that includes both laser sources in one system. The patented flexx function enables endless application possibilities with one single laser machine. Users can use both laser sources in one job without having to change the laser tube, the lenses or the focus manually.

"We are very excited about the new Speedy 360," says Warren Knipple, President of Trotec Laser USA. "As part of the Speedy family, the Speedy 360 offers the same productivity-boosting advantages of the tried and tested Speedy line – such as high-speed processing, a closed system design to minimise maintenance and lower the cost of ownership, and a flexible design with versatile application capabilities – with an optimised working area and compact footprint." ■

The newest member of the Speedy product line from Trotec

J-Cube takes the focus at ITMA 2015

J-Teck3 says its participation at ITMA 2015 will be focused on its dye sublimation ink J-Cube, representing its versatile range of products dedicated to industrial print-heads. Launched at Fespa 2013, it was initially developed for Ricoh and Kyocera print-heads used in industrial applications requiring high speed and quick drying on coated and uncoated transfer papers. The increasing success of this product, together with the introduction of new print-heads, has led J-Teck3 to develop new versions, both for transfer and direct-to-fabric applications, dedicated for use in different heads. The company says this now makes J-Cube "a diversified premium ink range".

Manufactured with J-Teck3's exclusive 'cluster technology', these inks have been tested extensively and represent the company's answer to market requests for high quality inks specifically developed for industrial applications such as fashion and home decoration.

With the strap line 'A Cube for every print-head', J-Teck3's offering at ITMA includes, for sublimation printing, the J-Cube KF (Kyocera), J-Cube RF (Ricoh), J-Cube NSK (Konica Minolta) and J-Cube PNF (Panasonic). Its direct-to-fabric products on show are the J-Cube KP (Kyocera) and J-Cube RP (Ricoh).

New for ITMA are four new high-density colours that have been added to the sublimation version for Ricoh and Kyocera heads – extra cyan, extra magenta, extra yellow and extra black. these have been specifically developed for Ricoh and Kyocera heads where customers are printing on uncoated transfer papers, providing utmost printability and vibrant shades with reduced ink limit.

Also on display in Hall 18 on stand D112, will be J-Teck3's complete range of digital inks, these being J-Next Subly, suitable for Epson DX6 and DX7 print-heads, and the J-Eco Nano Line disperse dyes with Nanodot technology for direct and transfer printing on polyester. The company's EPS System for double-sided printing with the digital direct-to-fabric printing process will also be featured. ■

Lechler triumphs in ESMA football tournament

The first week-end in September saw six European teams compete for the trophy funded by their member association, ESMA. Sixteen games were played and, in the end, it was Lechler who succeeded in becoming overall victor.

In the early morning Jon Bultemeyer from the German host party Marabu presented the team of his co-workers, as well as representations of Fimor (France), Lechler (Italy), MacDermid (United Kingdom), Saati (Italy), Sefar (Switzerland), as well as professional referees and organisers from VfB Tamm. Divided into two groups, the players delivered their careers' best performances to make it through to the semi-finals. Included were: "Beautiful goals, incredible saves and a fierce yet fair fight that could not leave the international audience disappointed."

Finally, the undefeated Lechler kept its momentum in the last game of the tournament against Marabu and won the final with 2-0. The third place was taken by Saati, fourth by Sefar, fifth by MacDermid and the crew of Fimor ended up sixth. However, there was no differentiation when all players and supporters joined the after-party and unanimously agreed that the ESMA tournament should return in September 2016. ■

Lechler remains undefeated to become the overall victor

Sun Chemical launches Streamline the ESL 2 inks for Roland Pro 4 printers

Sun Chemical has introduced its Streamline ESL 2 range of eco-solvent inks, which have been designed specifically for use as a direct alternative to Roland Eco Sol Max II inks in the Roland Pro 4 (XF 640, XR 640, Versa Express RF 640 and Versa CAMM VSi) series of eco-solvent wide format printers.

Streamline ESL 2 is the company's latest addition to its Streamline product range to use the HPQ-LO (High Print Quality – Low Odour) eco-solvent chemistry platform, which offers a significant advantage for printers working in confined environments. The seven-colour ink series includes CMYK with a revised nickel-free yellow ink, Light Cyan, Light Magenta and a new Light Black ink. ESL 2 has been perfectly colour-matched to the Roland Eco Sol Max II ink series, eliminating the need for re-profiling when converting from the original inks. Furthermore, it can be intermixed with the Roland inks to allow for easy transition without any waste.

Explains James Gould, Product Manager, Digital Aftermarket at Sun Chemical: "To guarantee exact reproduction to the Roland inks, the development of ESL 2 included the selection of a completely revised yellow pigment as well as the introduction of Light Black."

ESL 2, developed and manufactured at Sun Chemical's global headquarters for ink-jet at Midsomer Norton, UK, is available in 440ml cartridges and 1 litre ink bottles. These can be used in Sun Chemical's Streamline range of bulk ink feed systems, which have been designed specifically to meet the performance demands of the Roland Pro 4 printers and to offer improved productivity and reduced costs for customers. Sun Chemical will continue providing its ESL HPQ LO ink for customers using Roland's established Pro 2 and Pro 3 platforms. ■

The new Streamline ESL 2 eco-solvent inks from Sun Chemical

MEXICO PROVES TO BE POPULAR IN THE WIDE-FORMAT EXHIBITION SECTOR

Latest edition signals positive buying behaviour

According to organisers, FESPA Mexico 2015 sent strong signals of confidence in the Mexican wide-format printing sector, with exhibitors reporting positive interest and buying intentions from visitors to the show, which took place in August at Centro Banamex, Mexico City.

This year's show saw an attendance of 9,000 visitors

With more than 9,000 visitors this year, FESPA Mexico maintains its position as the leading event for the country's wide-format and textile print community, attracting a loyal following from the country's most prominent printers. Visitors to FESPA Mexico were high-level decision makers, with 46% having final say on investment and 90% being involved in the decision making process. Exhibitors endorsed the quality of the FESPA audience, with many making equipment sales during the show. The audience seniority was reflected in the high level of interest in the on-site educational conference.

Michael Ryan, Group Exhibition Manager for FESPA, comments: "Mexico is outperforming the Latin American regional economy and, while growth in the national economy slowed a little in 2015, FESPA visitors show themselves to be optimistic and committed to a long-term view where capital expenditure is concerned. Feedback from exhibitors and visitors affirms that FESPA Mexico is considered a 'must-attend' event at which to buy, explore and network, and exhibitor reports of strong sales – including one exhibitor who sold two machines within the opening hour of the show – testify to the confidence and firm investment intentions of Mexican printers."

LATEST TECHNOLOGIES

Visitors to the event, who were able to meet with 150 exhibitors showcasing the latest print machinery, techniques and product solutions across digital, screen and textile wide-format print, also commented positively about this year's show.

Miguel Ángel Jiménez, División Gran Formato, Midi Corp, notes: "This is the sixth

time I have visited, and each time the exhibition has something new to offer me. The whole world is here. I have met with large and well-known suppliers whose relationships I have maintained here throughout the years."

Additionally, Salvador Reyes, Director General, ADN Exacto, states: "The show this year has been really good. FESPA Mexico is a recognised exhibition and you can find almost all the important suppliers here in one place. I believe it's an important appointment to make year after year for all industry stakeholders that is why I always visit."

FESPA MEXICO COMPETITION WINNERS

Rafael Muñoz Morales and Juan Antonio Ramirez Ávila from Vallejo Tuning were announced as the new World Wrap Masters Series champions after an action-packed competition requiring entrants to wrap Range Rovers, suitcases and vacuum jugs. Commenting on their victory, Rafael Muñoz says: "Winning the title of the World Wrap Masters México was a dream come true. It was a pleasure and honour to compete side by side with the best installers from Mexico and all around the world."

The winner of the FESPA Mexico T-shirt competition, sponsored by Epson, was Daniel Alfredo Zapata Delgado from Luznegra MX. Fernando Cristobál Reyes Cervantes, Quid Publicaciones and Cesar Gonzalez, a freelance designer took second and third place respectively.

Exhibitor comments from around FESPA Mexico 2015 reflect Michael Ryan's observations. "Year after year we have seen proof that FESPA has the flow of visitors that we require, and allows us to reach the market that we are focused on. Every year we conduct our sales operation here and without doubt, it is a success," explains Juan Carlos Vega, Director General, Soluciones para Impresores

"GREAT SALES RESULTS"

Andrea Negretti, GM EMEA & WW Business Manager, d.Gen, adds: "In general, FESPA is important for d.gen. It's an exhibition that everyone knows, and each time we exhibit at FESPA we achieve great sales results. Furthermore, here in Mexico it is the most important exhibition for the graphic arts industry and that is why we are here every year."

"For us FESPA Mexico is essential, not only because it allows us to share all our products and solutions with the audience, but also because it is the reference point for the industry: the most important event for the graphics arena where we can connect with principle users, clients, business partners and all those who love this industry," are the views of Víctor Manuel Cabrera Andrade, SGBG & MOG Director, 3M. "At FESPA Mexico the attendees can experience the latest market updates, as well as the most important trends."

Visitors to the event were able to meet more than 150 exhibitors

"FESPA is the most important exhibition in the calendar here in Mexico, and for HP it is a must. We always achieve success and this year we are having an unprecedented interest," comments Alberto Corral, HP Sign & Display, HP.

"I always think of FESPA Mexico not only as a great tool for sales, but also as the place where we can find everyone. Suppliers attend, clients attend, distributors attend, and what we share with one another here is very interesting. Sometimes it is complicated to see each other, meet together, and FESPA Mexico enables us to do that," reflects Alfonso Pelaez, Director de Ventas, Casa Díaz de Máquina Coser

ANTICIPATED GROWTH PATTERNS

"This FESPA event is super-important for the Mexican printing industry. We have realised that as a company we expect to grow around 300 to 400% after the exhibition," are the thoughts of Yoann Giorsetti, Director de Ventas Internacionales, Siser. "It's spectacular. Here you will find so many people interested in the latest news and especially to meet with the product manufacturer. It has certainly given us a lot within the Mexican sector."

"The fact is that the results are excellent, both in terms of number of people who visited our stand, but also the audience who have visited the exhibition overall; the reality is that the results were more than encouraging. For several years we have participated at FESPA Mexico, it is really important to the business of our company," explains Jorge Camacho, Director Marketing Business Products, Epson.

"Really for us, it is always important to participate at FESPA Mexico. It is an event where the printers from different sectors come to update themselves with the innovations of the market and share their experiences," says Leopoldo Bravo, Sales Manager, Durst. "FESPA is the best exhibition to showcase our services. It provides us the chance to meet with clients and distributors, and show first-hand the robustness of our equipment."

Other comments include those of Josep Domingot, Vice Presidente, Anajet: "Our experience at FESPA Mexico has been very good. Lots of people attending, and many people from across Mexico, as well as having visitors to our stand from USA, Spain, and Colombia. To be honest we are really surprised by the number of people. We absolutely recommend the exhibition, for us as exhibitors, it's a way to know the market, especially the people across Mexico that we don't usually have contact with."

"Our focus at FESPA Mexico is to meet new and existing customers, discover their needs and to better understand the market. The show is also a great opportunity for us to present our portfolio of machines," adds Ivan Carrozzo, Americas Sales Manager, MS Printing Solutions FESPA Mexico 2015 has been great. The level of visitors is high, with a keen interest in new technology."

"In our stand there was a strong presence of decision-makers, such as owners of printing equipment and professionals from the commercial area. We were surprised by the quality," Chad Smith, Regional Manager, CWT Worktools agrees. "We had sales during the show, and leads that we will be working on after the fair."

"The show has been excellent. We had a lot of good traffic and a lot of good questions based on our equipment from both people looking to start in the screen printing business, or companies that are already established looking to expand. There has been a tremendous amount of interest," concludes Steve Baer, International Sales, Vastex.

FESPA Mexico 2016 will take place from August 2016 at Centro Banamex, Mexico City. ■

Further information:
web: www.fespa.com

AN IMPRESSIVE DEBUT

Inaugural Vietnam event proves to be truly memorable for all

When a popular world-class concept, with a track record of decades, gets extended beyond a country's borders, expectations are bound to be high. So when the demand from visitors and exhibitors alike resulted in the immensely successful Screen Print India event concept being extended to the Far East region, all eyes were on the debut of Screen Print Vietnam.

As expected, the inaugural edition of Screen Print Vietnam exhibition was truly memorable. Held from 30 July to 1 August at Saigon Exhibition & Convention Center (SECC), it provided a unique platform that enabled exhibitors and visitors to tap the market's inherent growth potential. It attracted 1,616 visitors from more than 14 countries in the ASEAN region.

Exhibitors utilised this rare opportunity to seize the new business prospects that its growing economy offers. In fact, given that Vietnam is such an attractive business proposition these days, even smaller firms joined hands and shared a stall with the aim of exploring the Vietnam market as well as the multiple benefits that it offers together.

STRONG ORGANISATION

Screen Print Vietnam was organised by Aditya Exposition (P) Ltd., with Vietnam National Trade Fair & Advertising (VINEXAD) being the local partner. Media partners were Screen Print India Magazine (India) and Yes Media (Vietnam).

The inauguration ceremony on the opening day was graced by M N Subramanyam, Fujifilm Sericol India (P) Ltd, Devang Sheth, Aditya Exposition (P) Ltd, James Wong, CSPIA, Fu Shuguang, CSPIA, Nguyen Thi Lac Huyen, VPIA and Ngo Anh Tuan, Printing Association of Ho Chi Minh City.

Leading global industry associations such as Specialty Graphic Imaging Association International (SGIA) USA, Vietnam Paint & Printing Inks Association (VPIA) Vietnam, Printing Association of Ho-Chi Minh City Vietnam and China Screen Printing Industry Association (CSPIA), China had their own booths. They interacted with visitors about the activities being carried out by them.

The exhibition highlighted new developments and showcased new offerings

There were 45 plus booths with companies from all over the globe highlighting various aspects of the screen-printing and the textile printing industry. Included were nine Indian exhibitors and leading among them were Blue Coat India, Dev Raj Rangwala, Fujifilm Sericol India, Grafica Flextronica, Impress Apparels, Keetronics India, Photokina Chemicals, Screen Art & Graphics, Sunlan Chemicals and Varsha Transprint.

Devang Sheth, Director, Aditya Expositions, in his capacity as the event organiser, pointed out that launching an international level screen-printing exhibition in India and sustaining it for twenty years is not an easy task. Deciding to extend the concept to the Far East required a leap of faith.

A LOGICAL EXTENSION

"This three-day event is a logical extension of the Screen Print India show, which has consistently been Asia's leading exhibition of international stature, attracting exhibitors, pavilions and delegates from across the globe," he states. "While the exhibition aims to highlight new developments and showcase new offerings to a market that is poised for substantial growth in future, its endorsement by leading industry associations has given it an official seal of approval."

Nguyen Thi Lac Huyen, Vice Chairman General Secretary, Vietnam Paint – Printing Ink Association, endorsed that this exhibition is helpful for trade promotion activities, promoting business cooperation, brand advertisement, technologies exchange for domestic and the leading enterprises in area and the world in screen, textile and digital printing sectors.

James Wong, General Secretary, CSPIA, adds: "We are very pleased that Aditya Expositions has extended the world class Screen Print India show concept to the Far East with Screen Print Vietnam. Over the past two decades, the organisers have really created a niche among the printing community world-wide. The debut edition of Screen Print Vietnam heralds a new phase, new opportunities and new horizons to be explored. It provides yet another platform for networking and interaction among the screen-printing community.

"China and India are the two fastest growing economies today," Wong continues. "We have a long-standing association with the Screen Print India exhibitions and our Chinese delegation from CSPIA has always made it a point to attend this truly international show.

Visitors were able to network and create new contacts

Now, the same enthusiasm and eagerness will be reflected in our presence at Screen Print Vietnam also."

The question voiced by certain exhibitors and visitors before the show was:"Why Screen Print Vietnam?" The success of the show's debut edition vindicated the vision and foresight of the organisers.

UPWARD TRENDS

Vietnam's economy and printing industry have been on an upward trend for quite a while now. From printing labels to packaging materials and a wide range of printing services, the industry is well settled and has made a reputation for itself. The rising number of private sector enterprises focused on these segments has

Continued over

The show attracted 1,616 visitors from more than 14 countries of ASEAN region

This was Screen Print Vietnam's inaugural event

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Direct Container Print takes place at the Radisson Blu Scandinavia Hotel in Düsseldorf, Germany.

Latest conference programme available at www.dcp2015.org

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fuelled greater growth and investments made in automation have begun to bear fruit.

At the same time, flexo printing and digital technology are also gaining in popularity. The time is right to highlight new developments and showcase new offerings to a market that is poised for substantial growth in future.

It required an organisation with established experience and expertise like Aditya Expositions, to identify this country's inherent potential and create a platform like Screen Print Vietnam 2015, which offered an exciting opportunity to benefit from the projected printing and packaging sector developments.

Exhibitors at Screen Print Vietnam 2015 encompassed technology drivers, knowledge transferees, manufacturers, distributors, dealers, service providers and allied businesses, contributing to any process of screen-printing, textile printing and digital printing. All were able to reach out to a focused audience and get maximum mileage.

The visitor profile comprised leading industrial screen-printers, technicians, consultants, professionals, entrepreneurs, products and service providers to end-users who are employing screen-printing, textile printing and digital printing as a substantial part of their process.

The organisers believe that those who are smart enough to identify business opportunities and make their presence felt at the right time are the ones who stand to gain the most. It is their business that increases. Year 2015 is one such phase where the printing and packaging industry is expected to grow 7% for the whole year and 10 to 12% next year at Vietnam. According to reports, there are more than 1,000 printing and packaging firms nationwide earning total revenues estimated at more than $1 billion a year. Plus, the domestic market is said to be accounting for a major share of this, which means its growth is not dependent on external business.

The Screen Print Vietnam exhibition facilitated entry into this high potential region by highlighting new developments and showcase new offerings to a market that is poised for substantial growth in future.

FIRST-HAND KNOWLEDGE AND INSIGHTS

The printing world has become one big global community. Every region has potential and each region is a marketplace for others to explore. Every country has a unique aspect that sets it apart from others. The factor that unites all is the passion for printing. From the basic manual jobs to high-grade automation, it connects all countries and cities to each other.

Reflecting this passion was a factory visit which was co-ordinated by Edgar Martinez, CEO of Nantex (authorised distributor of Heinz Walz GmbH textile printing machines) during the Screen Print Vietnam exhibition. The visit to the premises of this leading textile printer, close to Ho Chi Minh city, had the aim of not only showcasing the facilities and equipment but also for creating good relations and building a rapport with the enthusiastic visitors and exhibitors who were special guests at the Screen Print Vietnam exhibition.

Wong described the visit as a good opportunity to build trust and relations between countries. "Screen-printing is everywhere and the potential for further growth seems almost limitless. For this, it is essential to be updated with the latest developments. Time is everything now; for job orders to be delivered, for raw materials to be sourced, for getting the right technology, machinery and systems in place. Those who can keep pace with the changing world of printing will survive and flourish; those who do not will become history. Knowledge of the latest machinery, input materials, inks, substrates, technologies, is a must for survival and growth." ■

Further information:
web: www.screenprintvietnam.com

INDUSTRIAL PRINTING PLAYS AN EXPANDING ROLE IN SHAPING MARKETS

Michael E Robertson outlines how to discover more about this growing segment

Michael E Robertson

Industrial printing, once considered simply a manufacturing step, has become highly valued as a competitive advantage in countless markets. With the proven capability of screen-printing, and the new opportunities of digital imaging, manufacturers are finding new ways to differentiate their products through print.

At SGIA, we've seen this first-hand. The SGIA community is growing as industrial imagers turn to the Association and SGIA Expo to explore new capabilities and maximise existing technologies. SGIA supports both screen-printing and digital imaging technologies, thereby providing excellent and unique educational opportunities for industrial imagers.

This year, for the first time, SGIA will host the inaugural SGIA Industrial Printing Symposium in conjunction with the 2015 SGIA Expo. Featuring 13 presentations during the Symposium, this promises to be the start of something big. For a taste of what's to come, here are brief descriptions of four sessions.

ADDRESSING THE CHALLENGES OF PRINTING ONTO DIFFICULT SURFACES – BRUCE RIDGE, NAZDAR

The high diversity of surfaces onto which ink can be applied is a cornerstone of industrial printing, and each successive breakthrough in ink opens new opportunities for industrial applications. Bruce Ridge will describe adhesion, durability and other challenges, and explain how product development has been a critical step in growing the industrial printing sector.

Continued over

OVERCOMING THE CHALLENGES OF DIGITALLY PRE-DECORATED THERMO-FORMED PARTS – MIKE PLIER, EFI

Learn why digital pre-decoration of thermo-formed parts offers the image quality, colour pop, personalisation and customisation to make consumer and industrial applications tomorrow's goldmine, and see examples of production parts and learn how they were made.

THE EVOLUTION OF DIGITAL PRODUCT DECORATION – CHRIS DEMELL, ITW TRANS TECH

This deep discussion of approaches to digital product decoration includes platforms for integrated systems and challenges in the process, including speed/throughput, environment, regulation, durability, functionality and substrate variability. Explore strategies to overcome limitations, special considerations of the digital printing process, the use of digital printing in prototyping and the manufacturing of texture designs.

THE WIDE WORLD OF PROCESS MEASUREMENT – JOE CLARKE, CLARKE PRODUCT RENOVATION

As specifications get more explicit, the tolerances get lower and the client becomes more proficient in the latest image-measurement techniques, we need to rethink what, why and how we define and quantify our products and processes. For example, why we should measure biaxial stress of the mesh? How do we adapt static tension as a predictor of consistent dynamic tension? How do we know when the EOM and RzS2 are too high, or whether or not to give up durometer in favour of fit, flexion, fade and fatigue? This presentation is jam-packed with common sense – but not common knowledge – that you can take back to the shop and implement immediately for little to no cost.

We hope you'll join us for this premiere event and the 2015 SGIA Expo. Find more details at SGIA.org/IPS. See you in Atlanta! ■

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

Leading imaging professionals will be present at the 2015 SGIA Expo and the SGIA Industrial Printing Symposium

Attendees at the 2015 SGIA Expo can also take advantage of the inaugural SGIA Industrial Printing Symposium

Specialty Graphic Imaging Association

Further information:
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  - – Saves mesh costs: use white instead of more-expensive dyed mesh
- **Ultra fast exposing**
  - – Fast stencil throughput for high volume shops
  - – Assures thorough exposure, even with weak light sources
  - – Dependable polymerization assures durability and ink resistance
  - – Excellent wet strength, exposure latitude, and durability
- **High (44 - 46%) solids content**
  - – Dries quickly
  - – Better mesh bridging; lower Rz value yields sharper printed edges
- **High (6,000 – 8,000 centipoise) viscosity**
  - – Easier to control during coating, even on coarse mesh

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