



Image courtesy of Canon Solutions America Inc.

A Look at Digital Printing in the Packaging Landscape

Unless you've had your head in the sand, you've surely noticed how the digital print for packaging landscape is growing by leaps and bounds. From prototyping to short-run printing, and all the way to single-pass digital printers for even longer runs, digital printing's call is being answered in the packaging arena.

I reached out to some of the experts in this arena for a glimpse of what they see happening and their perspectives on this growing market. I started by asking them to define "package printing."

Weiss: What exactly do you mean when you refer to "packaging printing"?

Dave Cich, Vanguard Digital Printing Systems: When I think of packaging printing, it's label/cut sheets, corrugated sheets and white box.

Patrick Donigain, Canon Solutions America Inc.: For me, it's a focus on corrugated packaging, which includes not

only boxes, but retail displays and shelf-ready packaging.

Reed Hecht, Epson America Inc.: Generally, the flexographic printing process is used to produce packaging. Epson provides the ability to accurately color proof clear films, bags, pouches, shrink covers and any cover material or packaging material that has marketing copy and graphics. However, with the advent of more generic packaging containers, custom color labeling is being used by companies to differentiate and brand their products. This is where our ColorWorks and SurePress label technology is a new development in the industry.

Larry D'Amico, Durst Image Technology U.S.: For Durst, our effort is focused on the corrugated packaging market. There are certainly other segments, like folding carton and flexible packaging, but for us the development has centered on transporting and imaging corrugated

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By Ray Weiss, Director of Digital Print Programs, SGIA

The panel of digital print for packaging experts includes:



Mike Barry,
Business Development Manager, Packaging, FUJIFILM North America Corporation



Bill Brouhle,
Senior Application Specialist and Technology Center Manager, Agfa Graphics



Dave Cich,
President, Vanguard Digital Printing Systems



Larry D'Amico,
Sales Director — North America, Durst Image Technology U.S.



Patrick Donigain,
Senior Marketing Specialist, Canon Solutions America Inc.



Reed Hecht,
Senior Product Manager, Professional Imaging, Epson America Inc.



Liz Logue,
Director — Corporate Business Development, EFI

boards on our printers. Generally, locations that have a high level of color graphics and the need for short-run work is the best fit for the current technology.

Liz Logue, EFI: Broadly speaking, package printing is the printing of a label or a primary or secondary container. It differs somewhat from general commercial printing and publishing printing, where the printed product is the main item being sold or distributed. With packaging printing, the main point is to increase the value and appeal of the product inside. Digital creates many more opportunities for that, from the traditional retail space where you can create new and versioned designs and get them to market faster, to the e-tailing space — a market where one-to-one personalization is becoming a possibility.

Bill Brouhle, Agfa Graphics: Packaging printing is the art of combining advertising that grabs your attention in retail applications, whether it be printing on labels, card stocks or corrugated papers. More often than not, it will end up as finished housing for goods as boxes or as displays for merchandise, such as aisle end-cap displays.

How do you see packaging affecting your product offerings now and in the future?

Donigain: In the corrugated market, our direction is dependent on the growth of short-run or customized corrugated packaging, and the resulting demand for short-run production. Since our imaging technology already works well with corrugated materials, we are primarily focused on improving material handling — manufacturers struggle to keep corrugated boards flat with their current vacuum technology. On the Océ Arizona 6100 High Flow Vacuum series printers, we have redesigned the beds and integrated a high-flow vacuum system, allowing us to easily hold down corrugated boards, and help our customers keep board costs down and eliminate head crashes.

Cich: Packaging already has affected our product offerings. At Vanguard, we have created a flatbed printer with enhanced suction for small run prototype prints. And, we have also created a single-pass printer for high-volume printing.

D'Amico: Packaging will remain a key focus for our organization. The wide-format segment has flattened. In packaging,

future opportunity exists because the square foot volumes are so high, and the current amount of work done with digital equipment is so low.

Logue: In the future, I think you will see more innovations that drive automation, and a transition from analog to digital in packaging. Corrugated is a particularly large market where digital has had limited impact and, in a relatively short amount of time, EFI has made inroads both as a leading workflow provider and a leader in single-pass digital inkjet production for that space.

When we see packaging segments where we can have a similar positive impact on customers, you'll see us move even further, whether it is through future advancements in our corrugated offerings or in new products to address additional packaging segments.

Hecht: As many companies dive into a mass-customization model, there are more versions/iterations of product packaging being created. At Epson, we enable our design and printing partners to proof these packages using our printing technology, as well as produce some small test market/short-run examples. We see the need to proof these complex packages as increasingly important.

Brouhle: Whether it's for small- or large-run packaging or for mockup samples, the packaging market will always be an important segment for us at Agfa Graphics. We are continually looking to see how we can help our customers maximize their profitability through maximizing the image quality while minimizing ink usage using our patented 'Thin Ink Layer' technology.

What are some of the limitations you see as digital print enters the packaging market?

Brouhle: For digital UV equipment to satisfy the packaging market, the ink needs to have a large color gamut, be very flexible and have great adhesion to a wide variety of materials. Our ink has all of the key properties to address the needs of the packaging market. Moreover, Agfa has been making low-migration inks for years now, which are recognized for their innovative strength and contribution to durable and sustainable packaging of food and beverages.

Donigain: Printing on inexpensive

warped boards is a challenge. Inexpensive boards are not only warped, but because of the porosity of the liners, they're difficult to hold down with traditional vacuum pressure. As a non-contact form of print, digital requires the print surface to be extremely flat, with maybe less than a millimeter variance from end to end. Figuring out a way to hold down inexpensive warped boards and keep them remarkably flat is key to digital print's success. The previously referenced Océ Arizona series easily holds down warped porous boards, simplifying the printing process.

Achieving good print quality on inexpensive corrugated boards with digital printers is also a challenge. This is especially true for aqueous inks, which require pretreating or a precoated stock in order to achieve high-quality graphics. UV inks, like those in the Océ Arizona series, perform well on untreated mottled white, bleached or oyster liners, allowing the easy production of high-quality print on inexpensive boards.

Creating a digital solution which scales with opportunity is a real challenge in the corrugated market. Most small-

to-medium-sized box and sheet plants are nervous about spending millions of dollars on a digital print solution that has a fraction of the productivity of an analog press and lacks a solid market opportunity. They are being told to invest money in a market which, to them, appears to lack the ability to support a large investment. The market for digital print in the corrugated market is growing, but it still represents a very tiny percentage of overall corrugated production. The Océ Arizona series is designed to allow box and sheet plants to enter into the digital print market without putting their business at risk.

D'Amico: Obviously, ink cost is the highest variable cost in digital, differing from conventional printing where it is a very small cost component. Understanding these differences and the benefits of digital will have to be resolved for packaging to begin the transformation from analog technology.

Logue: The biggest limitation today is the perception of brand owners and corrugated companies that digital printing is just for short run. This is based on the

historical performance that digital was slow and expensive. However, the reality today is that digital printing is high speed, offers low cost and can address long runs in the corrugated market while enabling beautiful high-quality graphics.

Digital printing often creates value not only in helping companies deliver attractive products, but in streamlining the overall supply chain to eliminate a lot of the storage, waste and obsolescence brands contend with for packaged goods. And it is because of those supply chain efficiencies you see instances where a digitally printed package costs more per piece, but the overall costs in a packaging operation can go down.

Mike Barry, FUJIFILM North America Corporation: Digital is an ongoing evolution that has unique application-dependent challenges. One of the key areas is developing ink that is fit for the purpose. For example, inks required for folding carton are drastically different than inks for flexible packaging. Another challenge from a business perspective is converters adjusting to handling a few jobs a day to many jobs a day with a digital workflow.

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FUJIFILM works to help implement or suggest automation to help with these processes.

Cich: Food safety is a big issue as food-safe inks are not prevalent, and color fidelity — particularly when printing on a non-white corrugated — is another challenge. Additionally, many of the corrugated converters don't have operators that are trained for the challenges digital printing can bring to this market.

Hecht: The production volume of packaging generally lends itself to mass-production (printing press) technology, except as noted above when companies are looking to do very short run, small batch applications.

What in your current product line is being used in packaging printing?

Donigain: Currently our Océ Arizona series printers are used for corrugated box and display production. Multiple print manufacturers use our equipment for producing short run corrugated packages and displays, as well as for the creation of prototypes and samples. In addition, we do have accounts in the rigid box and folding carton space who use our flatbed printers for short run production and prototyping.

D'Amico: Durst has a portfolio of products referred to as Delta Series that offers a wide range of prices and speeds, from 50 to 5,000 boards an hour. These

include the Delta 250, Delta WT 250, Delta 2500 Plus and 2500 HS, and the Delta SPC 130.

Cich: We have the VK300D-SS. This is our VK300D with a tabletop with a "honeycomb-less" tabletop that has 140,000 1/8-inch holes and two 7.5 HP ring blowers. It is the most robust solution in the industry. Vanguard also has the VSP1400 single-pass printer.

Hecht: The printers currently used in packaging printing are the Epson SureColor P-Series printers and the solvent-based SureColor S80600 printer. The P-Series printers are the standard in the proofing market, and when combined with an adhesive-backed substrate, can be used to produce mockups for proofing applications. The SureColor S80600, with the inclusion of the white ink and some substrates from our industry partners, can be used to produce very highly accurate flexo proofing mockups and samples. The key is media from our industry partners like JetComp Systems, who make packaging-specific solvent-compatible materials.

Another key element is the software. Epson has partnered with GMG to present a market solution, which includes the S80600 printer, the GMG packaging RIP software and JetComp films to offer a tested and complete solution. Additionally, as packaging containers become more specialized, many companies are turning

to labels to differentiate and brand their packaging. The ColorWorks C7500 on-demand inkjet label printer and the SurePress industrial label presses are used to produce high-quality color labels for use in these packaging applications.

Brouhle: Agfa's Jeti Tauro 3300 and 2500 both have ultra-robust, variable, self-adjusting vacuum systems to make sure difficult substrates (such as corrugated) lay flat as they enter the press. Full automation stacking allows for fast-paced, high-volume production printing that is palletized (up to four pallets at once) and ready for finishing or shipment.

Barry: FUJIFILM offers the J Press series for folding carton, the Inca Onset series for corrugated and the Graphium for labels.

Logue: EFI Radius software, which is part of our Packaging Suite business and production workflow, is one of the top MIS/ERP systems used worldwide in label and flexible packaging, and folding carton converting. Our corrugated workflow products include the EFI Packaging Suite, which features a comprehensive Manufacturing Execution System for corrugators as well as EFI Escada software — the industry's leading corrugator control product.

Our EFI Nozomi C18000 single-pass LED inkjet press is one of the leading

digital production systems used in the industry today for corrugated packaging printing. Right now, it is in use at some of the top corrugated packaging companies in Europe, Asia and North America. It is a 71-inch wide press with up to six colors plus white and is capable of producing up to 10,000 35-by-35-inch boxes per hour two-up. That level of productivity makes it suitable for a significant amount of analog-to-digital transfer as it gives packaging companies the ability to switch from complicated litho lam procedures to high-graphic, direct-to-board production. The Nozomi press has also found a home in several major corrugated display producers, businesses that are now using its capabilities to drive greater value in high-end displays while also establishing new profit centers producing corrugated packaging. A new Fiery digital front end developed for the Nozomi press drives high-volume production, matches Pantone colors and also gives packaging companies the ability to do versioning — or even full variable work, where every box produced is different — at full press speeds.

Weiss: Two manufacturers were not able to contribute to this report, but I would be remiss if I didn't mention them. Their offerings are detailed on their websites.

The HP PageWide C500 Press is a single-pass printer capable of 75 linear meters a minute with a maximum board size of 1.32 meters by 2.5 meters up to a BC double-wall flute thickness. The water-based inks are food-safe for primary and secondary food packaging with no extra barriers needed.

HP's PageWide T1100 Series offers offset-substitutable quality on corrugated liners with a 110-inch, CMYK inkjet web press. It is capable of 30,600 square meters per hour (83 meters per minute). Lastly, the HP PageWide T400S Press is a high-speed inkjet web press for corrugated packaging. The web width is 42 inches (printable 41.7 inches) and prints at speeds of 183 meters per minute or up to 11,640 square meters per hour. HP uses a bonding agent for uncoated substrates, which is only applied where ink is to be printed for improved optical density on a wide range of standard, uncoated offset media. Infrared (IR) dryers use a combination of medium wavelength IR lamps and hot air convection to effectively dry prints.

Another single-pass printer in the market is the Barberan Jetmaster series, which is available in 1260-, 1680- and 1890-millimeter widths and can print up



Image courtesy of Epson America Inc.

to 80 meters per minute. The printer's ink is UV-curable, and it offers standard CMYK digital printing with optional light cyan and light magenta, or for expanded gamut, orange and violet. Suitable for all types of paper and flutes, the Barberan uses the ColorGate Production Server as a RIP, and the printhead offers three drop sizes and four gray levels.

Digital print for packaging is a robust marketplace with several options to cover short-run and prototyping applications, all the way to single-pass printing direct to corrugated. Application and budget will determine which option is best for your operation.

As an increasing number of wide-format print shops offer short-run custom packaging products, you don't want to overlook this business when promoting your capabilities.

Ray Weiss provides solutions and technical information on digital printing and digital equipment, materials and vendor referrals. Ray manages SGIA's Digital Color Professional certification program, digital equipment evaluation program and the PDAA Master Certification program. His 25+ year career in the graphics industry has spanned owning his own prepress and offset business to digital wide-format sales, training, support and service. Ray has extensive experience in color management and worked closely with the Smithsonian Institution to implement a color managed workflow in their Exhibits Department.

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