Widen Your Horizons

How wide-format printing can expand your business as new markets open in packaging, fashion and furnishing fabrics, ceramics, consumer durables and security printing.

By Heather Kendle

Five years ago print shop managers may have been forgiven for a degree of skepticism about wide-format inkjet. It was relatively new technology, commercially unproven and driven hardest by new, and by implication untried, suppliers. But today wide-format inkjet production has a strong foothold—there are a growing number of suppliers, a continually expanding range of products and even an emerging used machinery market. As a result commercial printers are starting to realize the considerable creative and business potential of digital wide-format printing.

Value of Large-Format Is Attractive
The commercial print business is a highly competitive industry with over capacity, tough competition and tight margins. Commercial printers looking to increase the scope of their businesses are looking at what other products they can provide to the market and wide-format printing is a natural expansion route for this sector. Wide-format printing, particularly printing directly onto rigid materials, is a high value, high margin sector and offers companies a good opportunity to diversify their commercial print business with complementary and creative wide-format print services. Printers who have taken the plunge have benefited from the fact that they can offer their clients a wider range of products in-house; and in return, customers appreciate the ability to work with one supplier across a range of campaign material.

Historically, the traditional analog equipment and labor-heavy procedures required to produce large-format signs, displays and Point of Purchase (POP) graphics was not a feasible option for commercial printers whose core business was offset printing. But six years ago this all changed with the introduction of digital, flatbed wide-format inkjet printers. These printers introduced the ability to print directly onto the surface of a rigid material, using instantly curable UV inks and at high quality. They can be added as another output system on the network; don’t require a vast array of handling, finishing and mounting equipment; and allow companies to handle products that they may not have considered printing before.

Large-format posters, in-store advertising graphics, printing on steel sheets, styrene sheet, backlit displays and canvas are all examples of areas which have enabled commercial printers to widen their coverage—literally! No longer is there a need to put out work or potentially lose a job to a competitor with the range of equipment available. The value of on-demand, short-run, large-format work is very attractive. Coupled with the fact that there is a decline in the average run length being specified by buyers, flatbed printers are a very attractive prospect due to cost efficiencies.

What’s the Difference?
Inkjet printing is a non-impact method which falls into two main categories: continuous and drop-on-demand. Continuous inkjet has the longest pedigree. Although it is fast, the print quality is poor and the
inks available are restricted, so it is most often used for date marking or coding. Some manufacturers use continuous inkjet technology systems for addressing and transactional machines, although historically these have mainly been monochrome. The types of inks are fairly limited, using solvent and oil based systems usually on paper.

The most familiar example of drop-on-demand inkjet is a desktop printer like the ones you would find in any office. These use one of three technologies: thermal, piezoelectric, or bubble jet. Drop-on-demand is a hugely successful technology and allows high quality printing on absorbent paper at very low capital cost. But the inks are basically water based with dye, making them unsuitable for most industrial applications.

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Most commercial and industrial wide-format inkjet applications use piezoelectric technology. The arrival of piezo inkjet was a major breakthrough. The piezoelectric (PZT) distorts in a controlled manner when an electric field is applied. It enables exact amounts of ink to be expelled from the printhead in the process. It is very accurate and predictable and the piezo heads have a fairly long life expectancy especially when they are correctly maintained. Piezo has the ability to use UV curing, solvent- or oil-based inks to potentially achieve very high quality results. It is the most flexible of the digital printing options available and is the single most important factor in the huge growth of wide-format imaging. The jetting speed is lower than continuous inkjet but is increasing rapidly and has much more scope in the future.

Inkjet is, as its name implies, a means of applying ink, using printheads, which will jet ink onto a substrate. Inkjet nozzles are finer than a human hair and yet they each need to work absolutely accurately. As an example, an inkjet printer which has to print a 1 meter wide CMYK swathe at 60 meters per minute and 600 by 600 dpi will require more
than 2 billion drops per second to be printed with almost 100,000 nozzles working continuously.

Printhead suppliers include Xaar, Spectra, Konica Minolta, Aprion and PicoJet. The main printhead suppliers are improving manufacturing accuracy as well as their yields, which will drive down costs. At the same time they are looking at stretching the technology to include variable drop heads, smaller drop jetting capability and improved jetting speeds. Piezo technology, while still in its infancy, is advancing quickly.

These printheads are mounted onto printers with useable workflows integrated into them to make them production capable by inkjet printer suppliers like: Inca Digital Printers, Durst, EFI (Vutek), NUR, Gandi, HP Scitex, and Zund. There are about 30 manufacturers of industrial inkjet printers and the number is increasing as investors recognize the growth potential. The range of inks is evolving and the cost of consumables coming down. As the technology becomes more established it is no longer seen as exclusive, tech-head equipment but as a standard and realistic printing proposition for a wide range of businesses.

The attraction of flatbed wide-format inkjet is its ability to produce higher value products (even lenticular 3D images), competitively priced short runs and the ability to print on a range of substrates without subsequent mounting processes. The application of drop-on-demand piezo inkjet gives users some very clear advantages. It is easy to use, high quality, and can handle a run as short as one print competitively.

When considering investment in wide-format you need to decide whether to choose flatbed or roll to roll. Flatbed printers use a horizontal static or moving surface where the material to be printed is held in place normally using a vacuum. Flatbed printers offer the benefit of printing directly onto the substrate, which eliminates the need for mounting required with roll printers.

Roll-to-roll printers, which were traditionally solvent printers, offer the option of being able to print flexible substrates in any length from a roll as well as rigid substrates which can be fed through the printer. However the accuracy of a dedicated flatbed printer delivers more benefits in print quality, as there are fewer issues with placement of ink on the substrate. Roll printers can often experience problems with feeding errors. With a dedicated flatbed you can, with most machines, accurately print double-sided files using a pin system for registration.

Wide-format printers are easy to operate and don’t require extensive training in order to confidently operate one or two machines at once. They take up less space than traditional printers and some models offer the ability to assess print quality as it is printing. The range of materials that can be printed using digital inkjet is extensive with many users now building niche markets in glass, wood, lenticular and ceramics printing. Lenticular printing is ideal for inkjet with the right printer, it needs to be able to print extremely accurately and some skill is required in set up.

Speeds vary but at the top end can reach 1720 square feet an hour (160 square meters an hour). That said, speed is a lot more complex to define than you might think. To make sense of it, you need to know exactly what print quality is being output at that maximum speed. All inkjet printers, no matter who makes them, will print better quality at lower speeds; none of them will print at top speed and top quality simultaneously.

Inkjet printers will produce one print as cheaply as 500 because once the file is RIPed it can be printed on demand at any time without complicated set up requirements; and as with any digital process variable information can be added, varying each print as required. A number of manufacturers also offer handling systems, which enable some additional speed increases to be achieved when producing multiple prints. Multiple printing is
simple with a flatbed machine using the RIP set up, enabling the print area of the bed to be maximized.

Most large-format inkjet machines are still four-color although six-color, eight-color and white options are now possible and are expanding further the number of printable applications and products. The leading machine manufacturers work closely with users to investigate new applications for inkjet and a great deal of money is being plowed into research and development.

**Quality Continues to Improve**

One of the most difficult areas to understand is print quality. Having accurate printheads with the majority of nozzles firing, optimum ink application positioning and robust equipment, which will minimize vibration or movement, is extremely important. Any slight defects or inaccuracies in these elements will show up when a file is printed. Techniques and procedures individually developed by manufacturers help to solve these problems with varying successes.

As the printhead technology continues to develop and manufacturers improve their integration skills, the already excellent quality of printing is improving. Whereas once, this technology was very firmly in the domain of the screen printers, it is now attracting the interest of industrial printers and commercial printers alike, conscious that it can now meet some of their needs.

Some printer manufacturers try to define quality as a figure relating to dots per inch, but dpi is not a real measure of print quality. The printer’s dpi, while it should not be ignored completely, will not give an indication of the resolving power of the printer, and it is the resolving power that will determine the inkjet printer’s ability to reproduce fine detail.

Often inkjet developments are as much down to the evolution in ink manufacture as it is to the machine developers. Digital inks tend to be a lot more expensive to produce than conventional ink due to the costs of technical development, formulation (such as pigment dispersion) and manufacturing. Over time, and as volumes increase, we can expect these prices to fall.

**Combine Equipment for Flexibility**

Increasingly, buyers will combine one or more inkjet machines with their existing printers such as screen-printing machines to enable increased efficiency and flexibility. The benefits are maximized when printing large amounts of white, metallics or a flood color that can be printed before or after the file is digitally printed.

If you’re printing solid colors then you need to be able to do this without banding. Make sure the inkjet printer can create the depth and strength of colors required for the work you handle and the range of colors you need. Any equipment demonstrations you have should be on the type of substrate that the job will be printed on or you may end up with a very different result.

**Many companies are already experiencing the benefits of large-format printing—it won’t be long before a great many more take the plunge.**

**Explore the Possibilities**

Inkjet printing offers the ability to print images onto an infinite number of substrates and testing and experimentation is ongoing. Potential substrates include: paper and board; wood; hoarding cloths and other textiles; flexible and rigid plastics; and even floor tiles. Samples of inkjet have been shown on the yolk of a fried egg and on a butterfly’s wing, although the commercial applications for these are thought to be limited. It is easy to see that key markets for the technology today are display and signage of all kinds, but its versatility is impressive and we will see new markets opening up in the years to come in packaging, fashion and furnishing fabrics, ceramics, consumer durables and security printing.

There is no doubt that today wide-format digital inkjet printing opens up a wealth of opportunities for commercial printers. It is interesting to look at the growth of flatbed printer sales over the last few years, increasing from 1,468 in 2004 to over 4,787 printers in 2007 and expected to reach 11,000 by 2009 (Info Trends/CAP Ventures). No longer is large format printing the exclusive domain of screen and specialist printers.

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