



## **DECIDING ON DIGITAL**

*In the following article Will Eve, technologies director at Inca Digital Printers, explains the issues that should be considered when looking at flatbed inkjet technology.*

The enormous advancements in inkjet technology in recent years have led to digital flatbed printers becoming firmly established alongside conventional printing - initially screen but increasingly litho. Digital printing was traditionally viewed as a way to improve efficiency for short runs and reduce waste. However, it now provides opportunities to expand new markets for customisation and localisation of print, for novel product decoration and for high levels of responsiveness.

But choosing the right flatbed printer is like buying a new laptop – you know that sooner or later something smaller and better will come along but you can't wait indefinitely.

If you are considering digital inkjet technologies for your company, the first hurdle you will encounter is how to measure and compare the many types of equipment and output produced. There are more than 30 industrial inkjet manufacturers that could potentially supply you with a system. These are too many to visit individually, so the initial task is to reduce the number of demonstrations that you need to see. Easier said than done.

The biggest problem is that manufacturers quantify the quality of print in different ways and even when they seem to be singing the same song, they may be doing it in different languages. If possible, at least decide what type

of work you intend to handle digitally. Print that will be viewed from a distance, such as large posters or hoardings, will require fast throughput but not necessarily fine quality. However, if you plan to concentrate on jobs that will be looked at close-up, such as gaming machine panels, then the ability to output high quality is more important.

So, that seems easy enough. Not so. First, you have to decide how to define speed and quality. A quote of 100 sq metres per hour might seem fairly unambiguous but you need to know exactly what print quality is being output at that 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. Speeds quoted are for large sizes - small items are slower in terms of m<sup>2</sup>/hr.

The most difficult area to understand is print quality, and you won't find the answer to this in an equipment brochure. Some manufacturers try to define this as a figure relating to dots per inch, but dpi is not a real measure of print quality (don't try to convert lpi-lines per inch to dpi-dots per inch). 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.

The inkjet heads must have the ability to place dots accurately on the digital grid, which the RIP uses to create the image. The resolving power of the printer depends mainly on the accuracy with which the printer can place drops on the grid points. The RIP calculates the size of ink drops and which colour drop should go on which grid point. Be wary of RIPs that offer faster speeds by throwing away some of the image data. If you lose the job detail at this stage then it's gone forever and you won't achieve higher quality later on.

There is no set standard for measuring the resolving power of a printer. It is something that is affected by a range of features: the height of the print head from the substrate, the size of the ink droplet, how smoothly the head moves across the substrate, the set up of the machine and the speed of printing. The software and electronics incorporated into the RIP and printer will also affect the results.

Digital output devices use an electronic grid to position the dots that make up the image. The grid's *addressability* indicates its *resolution*, measured in dpi. Typically the coarser the grid (a low print mode) the more tones and the finer the grid (a higher print mode) the better quality of the image. You may often find that there are two different measurements eg 300 x 600 dpi. Beware claims of resolutions of 600 dpi because this may be in one direction only. The size of the grid will alter depending on the print mode used but this is not infinite. The printheads used in an inkjet printer will ultimately limit the grid size and therefore dpi due to the size of the drops possible to produce.

What is vital to achieve fast printing speed at high quality is a machine that jets small drops (less than 30 pico litres) at high frequency, combined with the ability to handle the data and ink to get the most out of the print head. However, the placement of these drops also has to be controlled accurately, so that they land where you want them to in order to minimise shadowing caused by turbulence. Without this control you won't be able to reproduce fine text or clean lines and curves. A small droplet size will not guarantee quality but large droplets will certainly limit it.

Creating fine detail is not only controlled by the power of the RIP, the software used and the inkjet heads. Check the mechanical parts of the printer. If there is not a smooth and controlled movement then there will be unacceptable vibration in the inkjet heads and quality control will be lost,

regardless of how good the other elements are. We have found air bearings and linear drives give excellent results.

If you're printing solid colours then you need to be able to do this without banding. Make sure the inkjet printer can create the depth and strength of colours required for the work you handle, and the range of colours 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.

What would benefit everyone in the inkjet sector would be for manufacturers and suppliers to agree a standard to clarify to potential buyers how print resolution is measured on their equipment. If an agreed, common, set of 'buying criteria' could be created then a great deal of uncertainty, confusion and even incorrect purchasing decisions could be avoided. Perhaps one day...

Before you buy, here's a quick list of things to do:

1. Buy a stopwatch
2. Provide a simple image to the manufacturer well in advance, combining big blocks of several different colours, text of various size (black and process colour), and a photo.
3. Watch the image being printed at fast, medium and slow speeds. On each sample write down the total time taken from pressing the "Print" button to taking the printed material off, including RIP time for every print if the machine RIPs.
4. Test for adhesion on some of your most common substrates.

You may conveniently do trials on several types of printer at a trade show if you arrange it well in advance with the manufacturers. You will find Inca printers at exhibitions on Fujifilm Sericol stands.