



New Technology Yields Cost Savings & New Competitive Edge

A White Paper on Industrial Inkjet Printing

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About the Author:

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Historically, custom and short-run printed graphics have been hindered by expensive and laborious set-ups. Additionally, the technical difficulty in printing high quality, one-off graphics made profitability questionable. This problem has been especially apparent when the printed graphic required 4-color process printing.

The Miracle that is Digital

Those problems have been dramatically mitigated, if not erased, with the introduction of digital inkjet technology for industrial printing. Principally, the same inkjet technology that we use at home to print our vacation photos has now been adapted to address industrial applications. Companies that already make use of these new printers are reporting the numerous benefits you would expect from digital technology over analog processes.

While the benefits differ in each case, most users report lowered operating costs first and competitive edge gained second. The lowered costs are a result of digital technology avoiding costly set-ups as well as reducing outsourcing and inventory. The competitive edge that users are touting is an ability to produce higher quality, 4-color process graphics for their customers, even for small quantity jobs or one-offs.

The “digital” benefits for industrial printing have long been predictable. That leads to the question of what characteristics must an inkjet printer possess and what features must it offer, to make itself ideal for these applications?

UV Curable Ink is ideal for printing on:

- Metals
- Plastics
- Glass
- Acrylic
- Vinyl

Key Factors That Make Inkjet Printers Appropriate For Industrial Printing Applications

The first key factor in transitioning inkjet technology into industrial applications is the **introduction of "UV curable"** inkjet ink. UV curable ink takes use of a UV lamp that travels along with the inkjet heads and instantaneously cures the ink and bonds it to the substrate. The result is an ink that will satisfactorily adhere to a diverse number of substrates including metals, plastics, vinyl, glass, acrylic and wood! Additionally, most UV curable ink sets include an opaque white ink which is necessary for printing on clear or dark colored materials.

The second key factor is the advancement of **flat-bed printer technology**. Flat-bed printers, as opposed to roll-to-roll printers, can handily print onto already cut and formed products. This proves instrumental in printing on parts that may have been outsourced and produced elsewhere. This also dramatically cuts down on inventory as only "blank" products are stocked instead of the same part being repeatedly stocked with varying printed graphics. Flat-bed printers normally work with the use of "product fixtures." Fixtures are designed to hold specific products in place and match up with the software such that the graphics are printed on each part in the correct location of that part. Conveniently, fixtures are typically preloaded and placed on the bed of the printer like a tray. The result is a more efficient printing process.

The third key factor in transitioning inkjet technology into industrial applications is **user-friendly, seamless printing software**. Newly created software has taken big steps in reducing the process complexity and increased efficiency. In fact, this new simplicity has made it possible for managers to transition existing employees (working on screen print lines or other traditional printing processes) into new inkjet printer operators. This avoids having to hire new (and likely more costly) specialty operators. Lastly, the software's ease of use and automation drastically reduces the opportunities for human error and minimizes time spent on graphics preparation for individual orders.

In fact, this new simplicity has made it possible for managers to transition employees working on screen print lines (or other traditional printing process) into new inkjet printer operators.

Key Considerations in Selecting a Specific Inkjet Printer

Print Quality Specs:

-A good industrial printer will have a print resolution of 600 DPI (dots per inch) or Better!

-Ink droplet size (or volume) is measured in picoliters. The best industrial inkjet printers will go down to 6pl. For perspective, the average rain drop measures about 10,000,000pl.

It has been established that the suitable type of inkjet printer for most industrial printing applications is a "UV Curable, Flat-bed" printer with CMYK plus opaque white ink. A survey of today's market indicates that there are several brands and models that fit this description. The most relevant considerations in making a final selection are as follows.

Print Quality: A particular inkjet printer's quality is usually determined by its print resolution (the higher the better) and the size of the ink droplets produced (the smaller the better) among some other variables. For most industrial applications, a high print quality is required. This is because often times the information or design being printed is small and will be viewed close up. Additionally, many manufacturers have very tight tolerances on a print's dimensions (For example, the hash marks on a pressure gauge dial for medical equipment may need to be extremely precise and extremely accurate). Generally speaking, printers with higher print quality will also hold tighter tolerances.

Production Capabilities: There are an enormous number of different inkjet printers currently being manufactured. Each is built for a specific purpose or application. When choosing a printer for an industrial application, it is important to consider factors like: the flat-bed weight limit, flat-bed size (many times, smaller is actually better), printer speed, printer durability (will the printer run 3 shifts, 7 days/week?), etc..

Functionality: How will the printer function in your application? Or, perhaps you have multiple applications? Some printers are more "application flexible" than others allowing a faster, easier switch from product to product. Additionally, certain printers may allow for more than one UV ink type to be used. This could be an important factor as some applications require a special "flexible" ink, for example, embossed Lexan membrane-switch overlays.

Bonus Benefits of Inkjet Technology

When considering the implementation of inkjet equipment into an industrial application, the core strengths of inkjet must be compared to the traditional methods being used. However beyond the core strengths, digital inkjet printers offer us some additional features that can add additional value to the final product. These additional inkjet features may not necessarily be unique to inkjet printing. However, what is unique is inkjet's ability to use these features in a cost effective way for short run and custom printing jobs.

"Spot Gloss" is a prime example. Some UV curable inkjet printers can print a clear gloss ink along with the CMYK colors, thereby enabling any part of the print to have a glossy sheen. Screen printers can accomplish the same look, however it is an expensive option, especially when the printed product contains variable data.

"Texturing" is also a great feature. Because white UV curable inkjet ink is opaque with pigments, texture can be "built" by printing multiple layers of white ink follow by one layer of CMYK. The result is a great texture that can emulate any pattern desired (for example, "diamond plating" or "woven linen", etc...). Texturing is a popular option for printed products that will ultimately be handled by the end user on a regular basis.

Today and Looking Forward

The industrial printing market is being positively influenced by inkjet technology. Inkjet has clearly proven to be a valid option for many of the market's needs. Now is the perfect time to research the current inkjet printer options available.

Despite already having a positive influence, inkjet technology for industrial applications is merely in its infancy. Expect the next twenty years to be as innovative as the last as new technology continues to improve on printing mechanics and ink chemistry. Moreover, the software and other automation tools will continue to increase the productivity and efficiency of industrial printing.