

Benefits for Packaging and Labels Through Digital Printing

*Kristel Moncarey and Geert Van den hole
dotrix N.V.
Gent, Belgium*

Abstract

Flexible Packaging and Labels are far the most profitable and dynamic packaging sectors, accounting for a total converted value of \$72.35BN per year worldwide.¹

It goes without saying that the players in these markets can profit highly from industrial digital color printing as the consumer goods, label and packaging manufacturers experience the (growing) need for short-run printing with variable items becoming stronger in the printing industry.

The number of one-reel jobs is growing each year. To stay competitive, consumer producer companies (CPC's) will have to embrace digital printing.

With the current Drop-On-Demand full color inkjet technology new areas are open for industrial digital printing. Size, production and cost are approaching the market requirements for short-run.

The market fitness, cost savings and post-printing possibilities of industrial digital color printing are discussed and illustrated with a cost case, comparing the total converting process for conventional printing and industrial digital inkjet systems.

The Industry Challenge

Although highly competitive, according to the Flexible Packaging Association, the flexible packaging industry has grown by 33% in the past five years. With a converted value of \$27.33BN per year worldwide, the Labels market is also one of the fastest growing sub-sectors within the printing of Packaging.

The driving force after the growth rate of the packaging tend to be the consumer producer companies. With shortening product life cycles and increasing varieties, the CPC's are pushed in the direction of short-runs and ditto lead times. Consumer goods product life cycles of 6 months before a new flavor, design or size is produced are not uncommon. Increasing competition puts pressure on the market prices and costs while increasing product variety and turn-around. Brand protection is more than ever challenging. If a CPC or a printer/converter wants to stay competitive and keep up with the trends, digital inkjet printing delivers the profit/serves your marketing and financial needs. By delivering Just-In-Time the required short-run job, industrial inkjet satisfies the hunger of the highly demanding end-customer with a cost-effective solution:

- Reduced set-up time
- Minimal change-over time

- Productivity higher than 500m²/hr
- Various substrate types, widths and thickness possible => non-contact printing
- On-demand customization - efficient test marketing, anti-counterfeiting, variable data

It all comes to choosing the best production tool for short-run printing with the best economic fit for the total converting process.

Technical and Market Fitness

The Converter's Role – General

Characteristic for the flexible packaging and label market are the numerous finishing processes and the print material used.

Discussions are endless when it comes to in-line versus off-line finishing. It is often said that in-line printing and finishing is the ultimate goal of the CPC's and printer/converters. This implicates aligned speeds of the printing and finishing units and matching widths. Moreover, to fully benefit of both units, it is compulsory to use them both in the same run. E.g. the printing unit cannot be brought into action for one job, while another job is being finished simultaneously.

The modularity of an industrial inkjet system allows various printing and substrate widths for various applications. While the digital press can print various short-run jobs after one another, the finishing equipment requires change-over time for every format or design change. The set-up time of an in-line system is the sum of the set-up times of the different sub-systems. Optimizing the press and finishing time is to the advantage of off-line systems where maximum benefit of speed and modularity of both systems can be used.

Substrates

The ability to use various substrates with different thickness and width provides the converters/ CPC with an enormous flexibility. Thickness is irrelevant as through the use of non-contact printing the distance between the print unit and the substrate can be tuned. Substrate settings are set once, saved and reloaded when the substrate is run again. Flexibility is key.

Non-contact printing allows waste management of substrate. The printed width equals the width of the substrate. Configurable printing widths are possible with industrial inkjet.

Inks

In the industrial printing industry, companies active in flexible packaging and labels have stern requirements towards the ink used in the printing process. Within the manufacturing process the ink has to withstand thermal deformation, folding, pressurization, stretching in-mould labeling and other post-printing processes.

UV-curable jetting inks are the better choice for many industrial printing applications.² UV-ink is immediately dried after printing and has a high light fastness, heat and scratch resistance.

Finishing

Varnish

Opposed to conventional printing systems, a varnish after printing is not needed. When cured a UV-ink is hardened out. Through this polymerization process the cured ink is then comparable with a plastic. UV-cured ink adheres very well to a wide range of substrate and has a high scratch resistance.

Heat Sealing

Printed samples that are converted into sachets, bags are often heat-sealed. The inner side of the substrate contains a heat seal lacquer or layer. Tests have proven that UV-cured ink withstands easily the heat produced to fulfill the sealing process while the adhesion properties of the ink do not change.

Cutting, Rilling and Folding

Proofs have shown that UV-ink withstands perfectly die cutting, rilling and folding. Even pre-rilled substrate can be used through the use of a product market to identify the exact printing area.

Economical Benefit

Technical fitness is only one part of the feasibility study; the financial aspect is another one. To compare systems, it is crucial to compare adequate and complete figures: all related cost items should be taken into account: consumable parts, maintenance time, inventory costs, pre-printed material becoming obsolete and let's not forget...productivity.

Productivity

Digital has taken a lead the past years. However, for an industrial environment, productivity could still be improved. Now, in the field of industrial inkjet a throughput of over 500m²/hr can be achieved, which is much faster than any other digital system. The high productivity puts industrial inkjet in a favorable position when it comes to cost comparison, as return is faster achieved.

Reliability/Robustness

The web handling system of the industrial inkjet press is based on the technology of conventional printing presses. The proven reliability of these base engines serves also the digital inkjet press. Also the fact that

there are no special room conditions required for operating and industrial inkjet press proves the robustness of the solution. Through the construction of the press, the print engine is not subject to outside influences.

Run Length

We compared cost factors for a specified job printed with a conventional UV-flexo press and an industrial digital inkjet press. The crossing point in run length, where conventional systems become more profitable (cost per copy) meets the current demand for 1 or 2 reel orders.

The economical advantages offered with an industrial digital inkjet system are found on various levels:

- Minimal set-up times
- Minimal substrate waste
- Up to the mark packages
- Rapid change-over times
- 1 variable cost/ consumable: ink
- high speed printing of variable images using the fastest grey scale heads available

Print-On-Demand:

- No waste of ink/ substrate
- No inventory of plates/sleeves
- No proofs
- No inventory of pre-printed stock

Conclusion

If the Consumer Producer Companies (CPC's) and printers/converters want to stay competitive in the packaging and labels market, the will have to embrace digital printing. This will not only allow them to cut on costs – inventory costs, cost of short-run – but sharpen their market position by delivering on-demand short-run jobs. Short-run digital printing base don toner started off in commercial printing. In the industrial printing applications, it is not only the printing but the total converting process that is important. Inkjet, with its increased productivity, drives the economics for short-run and digital printing gin these markets.

References

1. Source: IT strategies September 2002.
2. Nigel Caiger, Industrial Applications of UV-Curing Jetting Inks, Proc. DPP2001, pg. 161 (2001).

Biography

Kristel Moncarey holds a university degree in Applied Economics. After graduating in 1998 she started working for Barco Graphics as a Quality Coordinator. After 2 years she joined the Marketing Department of the Digital and Special Printing Division who spun-off from Barco Graphics and is now dotrix. Since then she takes care of the product marketing for the factory for the packaging and label market, allowing her to keep a sharp eye on trends and new technologies for industrial printing.