



## Digital Inkjet vs. Flexo Label Printing

*Comparing technologies for a growing market*

Packaging market segments including folding carton, corrugated, flexible packaging and labels, primarily use conventional printing technologies, such as screen, flexo, offset and gravure. Screen printing and its versatility support the leading conventional print technologies with regard to pre-printed white, brilliant or vivid colors, varnish and high or low tactile for creating the major part of the image.

At present, one could wonder if there is a rise in inkjet use for label printing. Is the industry seeing a gradual increase of the replacement of conventional flexo by inkjet?

When Indigo introduced its first digital printer, less than 10% of the total volume of labels were digitally printed. There were some hurdles to overcome to become a significant player in the packaging industry. Some label printers' doubts could have been:

- Is the label a high-resolution or a low-resolution product?

- Is the pricing of the developed inkjet printer appropriate to still make profit?
- Is a hybrid printer a better investment/development to use for both short runs and medium/long runs, rather than a stand-alone inkjet printer (only for short runs)?
- Do I have to stick with my conventional flexo press (efficient for the long runs)?

A couple of years later, the conventional flexo label printers were convinced by the early adopters of inkjet/hybrid label printers and therefore they made a good decision to invest in inkjet/hybrid printing.

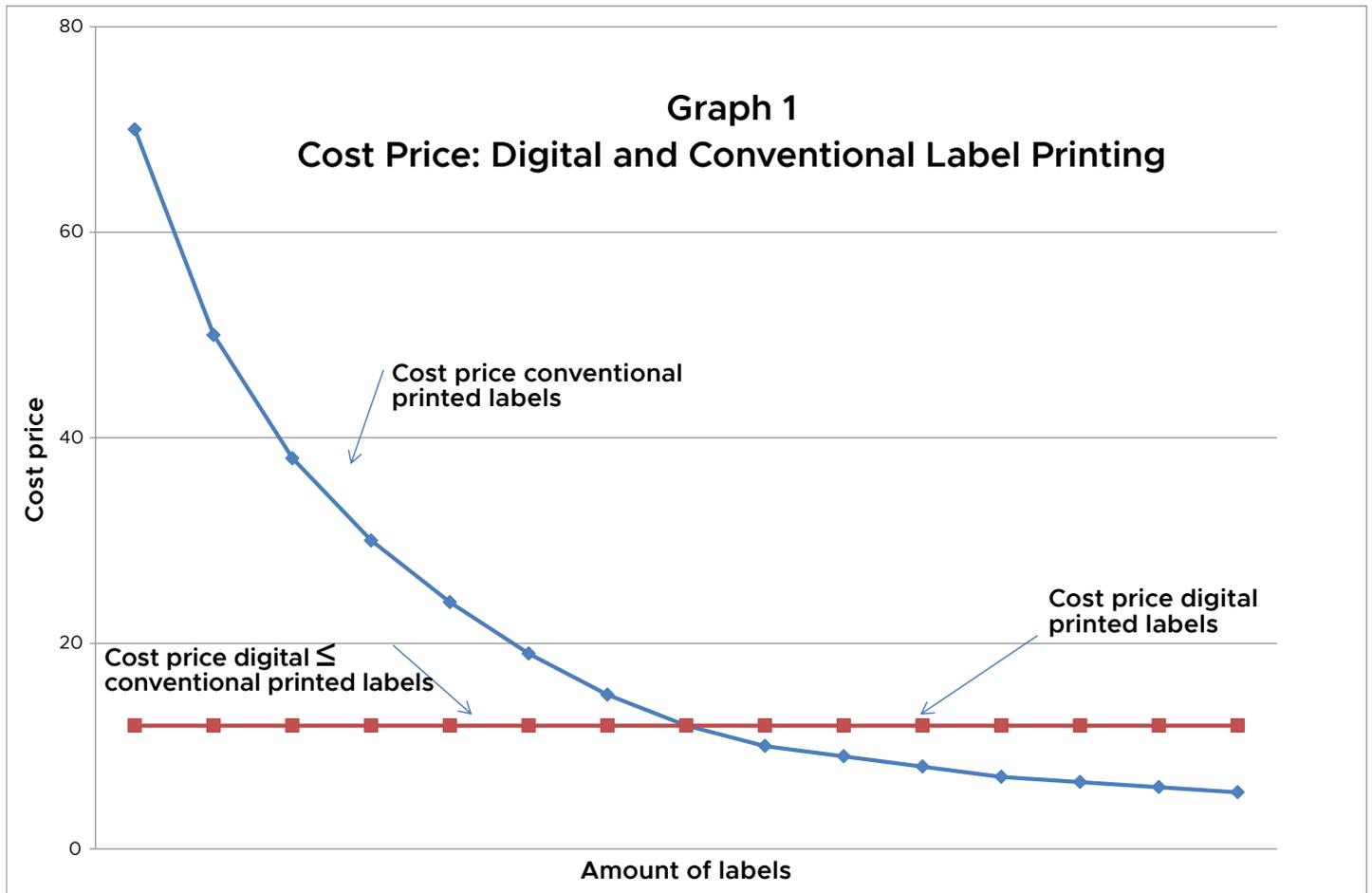
### Why Inkjet Label Printing?

There are several reasons to replace conventional flexo printing with digital inkjet for labels. One of the most important is a similarity between the ink deposit and resolution of flexo and inkjet, and the existing mix of sizes of commercial

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By Wim Zoomer, Industry Author



The cost price development of digital inkjet and conventional flexo printed labels.

print jobs. The label buyer's package often contains the need for short run and longer run jobs — though the average run length is becoming gradually shorter.

Delivery of the printed labels on demand is a way to reduce the space the label buyer needs for inventory. Digital printing is the way to satisfy the label buyer and to maintain a certain price per unit to make a profit.

The need for a lower price per unit for labels remains relatively high. A lower price per unit becomes feasible when the labels are printed using digital inkjet, because inkjet does not require any print forms or a proper set-up, eliminating wasted ink and substrate. The relative cost vs. amount of labels will remain constant. Inkjet printing is a cost-effective technology per unit for labels, particularly for small quantities. Conventional print technologies, such as flexo printing, do require a print form.

In this way, costs and benefits of digital printing are optimized for small quantities of labels (short runs) and small series of labels for test or sample purposes.

Hybrid label printing bridges the gap between digital inkjet printing and conventional flexo printing. Although

initially a larger investment, it enables the printer to easily change to a different print technology.

Digital inkjet printing seems to be a slow process, in comparison with the converting process. If both processes are optimized in terms of speed, the processes will be more compatible, and both will be used more frequently.

There are several benefits in adopting inkjet technology, including the following:

- Digital printing opens the door to personalization, such as adding a personalized message to the label.
- A digital inkjet-printed label may contain variable data, such as names or numbers from a database and barcodes, or multiple versions of the same label can be printed.
- Increasing the size of the label is virtually unlimited, depending on the digital capabilities rather than the circumference of a flexo plate.
- A hybrid inkjet printer is a combination of an inkjet printer and a conventional flexo printing machine. It allows the label maker to provide long, medium and short runs.

#### Cost Factors

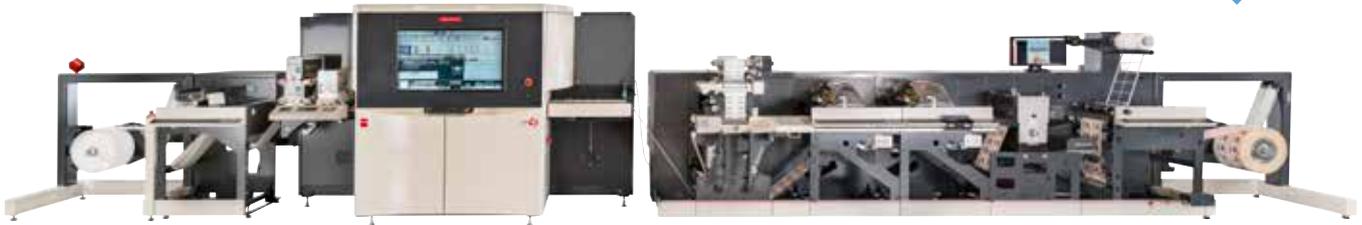
Despite its many benefits, a limitation of the inkjet printer is the relatively high price of the ink cartridges. The digital print speed may be slower than the conventional print speed, and the cost per liter of inkjet ink may be substantially higher than conventional ink. For short production runs, however, it's digital that will win on cost. Graph 1 illustrates that a short run of digitally printed labels is, per unit labels, more cost effective than conventional flexo-printed labels.

Because of the presence of flexo cylinders and flexo plates, conventional flexo printing is typically a long-run application. Per unit labels, it is the more cost-effective route for mass-production.

#### Conventional Flexo vs. Hybrid and Inkjet

Conventional flexo printing needs an extended setup and lead time. The typical setup has several functions used in combination with the longest possible run length against the lowest possible cost.

Conventional flexo printing has five, six, seven, eight, etc. colors, possibly including white and other spot colors. It includes a



Nilpeter's Panorama digital inkjet label press. Courtesy of Nilpeter.

number of back print stations, combined with a turner bar, a die-cut station, pre-coat station, cold foil, lamination and rotary screen, completed with an unwind and a rewind. This setup is for a typical long run (more than 12,000 labels) application. It may be clear that this will deliver less or no profit at all for short runs.

A stand-alone inkjet press is a separate collection of CMYK digital inkjet print stations, with some spot colors completed with an unwind and a rewind. The stand-alone inkjet printing process may be completed with finishing units, such as a die-cutting, varnishing, foiling and lamination. Separating the printing part

from the finishing applications may substantially impact productivity. Inkjet printing is a typical short-run application, up to a maximum of 1,300 labels.

Hybrid printing is a smart combination of the best characteristics of conventional flexo and digital inkjet printing in one line, or positioned on one platform, to expand the stand-alone digital inkjet application. The mid web hybrid label printer is completed by in line finishing, which does not affect the productivity of each individual print technology.

It's worth noting when referring to narrow-, mid- and wide-web printers, the exact width is arbitrary, and can only be

For short production runs, it's digital that will win on cost.

## Short or Medium Cutting Runs... Why not do them in-house?

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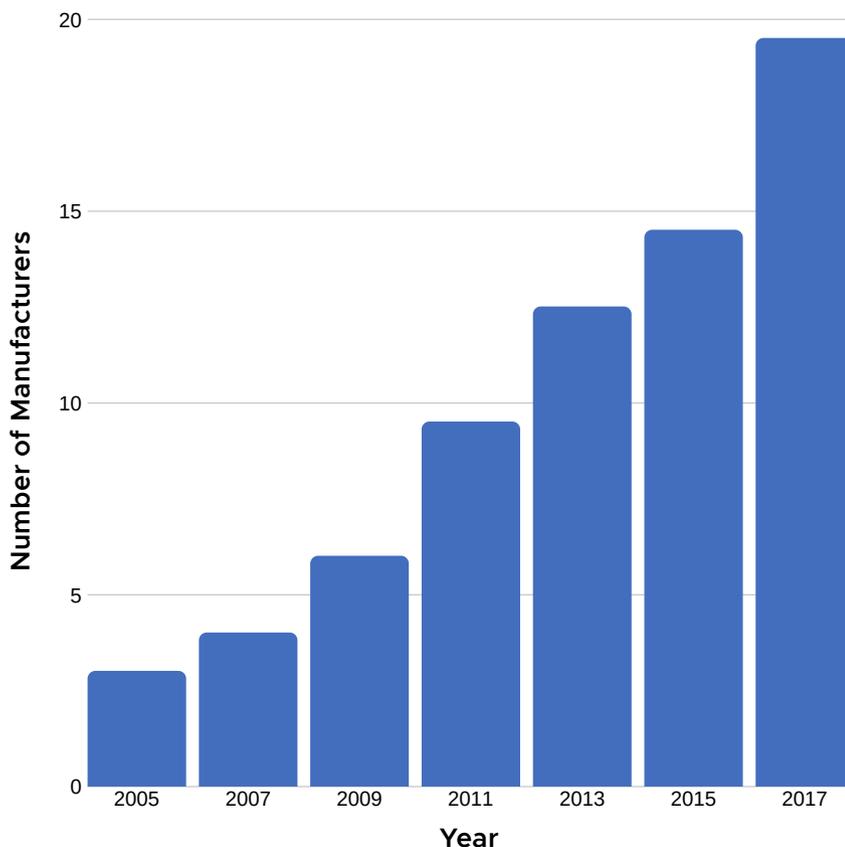
Brochure





The Durst Tau 330 digital inkjet label press. Courtesy of Durst.

## Graph 2 Narrow-Web Inkjet Label Printer Manufacturers Present at Labelexpo Europe



The presence of UV inkjet or hybrid manufacturers at Labelexpo Europe.

given by estimation. Narrow web refers to smaller than 18 inches, mid ranges from 18 to 40 inches, and wide web is wider than 40 inches. Label printing is a typical narrow-web application. Most inks have been developed, in terms of speed, for narrow-web printing (a few hundred feet per minute), rather than the speed of wide web (1,000 feet per minute).

### The Market Today

Several joint ventures have marked the development of inkjet, including Agfa and Edale, Bobst and Radex (Mouvent), Dantex and Screen Europe, Durst and Omet, Fujifilm and Heidelberg (Gallus), HP and Indigo, Inx and Uteco. Graph 2 shows a gradual increase in the presence of narrow-web inkjet manufacturers in the label market as seen at Labelexpo Europe.

As customer demands change, there are many factors and products for businesses to consider in the conventional vs. digital debate, whether they're currently tapped into the label market or looking to expand their services.

*Located in the Netherlands, technical author Wim Zoomer has several published articles in screen printing and industrial technology magazines about flatbed and rotary screen printing technology for both graphic and industrial applications. He is the author of "Printing Flat Glass," a book about architectural glass decoration processes. Wim has been a consultant of the European Screen Printing Manufacturers Association (ESMA) and board advisor of the U.S. magazine, iSP (industrial + Specialty Printing). He is a member of the Academy of Screen and Digital Printing Technologies. Contact [wimzoomer@planet.nl](mailto:wimzoomer@planet.nl).*