White paper

Pre-print vs. in-line printing of corrugated cases and cartons

In today's fast-paced, constantly changing production environment, one thing that has not changed is the need for suppliers to case their goods and to have the appropriate markings on those cases. In the past, this has been primarily satisfied with pre-printed boxes. As the economy has evolved and grown, companies have expanded SKUs dramatically and are selling into ever more diverse global locations. In addition, the requirements on cases for identification and tracking have increased. All of these factors have forced companies who primarily rely on pre-printed boxes to dramatically increase SKUs (and quantity) of those cases. Companies that are looking for methods to reduce cost and maximise space have found ways to reduce or eliminate the proliferation of pre-printed boxes.

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How can companies reduce case inventory and cost?

One strategy that companies have employed to do this is to adopt in-line variable printing on cases at their factories using industry proven, high resolution case coders. These high resolution case coders can reduce inventory by a factor of 10, provide much needed flexibility, reduce operational and planning complexity, maximise space, and ultimately save money.

Pre-printed cases

Pre-printed cases have been widely used for many years to present information such as product name, brand, production data, shipping symbols, ingredients and more.

Technologies like flexographic and offset printing are the typical technologies that are used for pre-printing. Pre-printed cases are printed in large batches and each case in a batch contains the same information. Variable data, such as a production date, lot number or ingredients listing must be added at the end of the packaging line using labels, case coders, stamps, or a combination of these methods.

Product differentiation, regulatory requirements, and the need for multiple languages when doing business abroad have led to a proliferation in the number of different pre-printed cases required. When touring an average product manufacturing or contract packaging facility, it is common to find multiple floor-to-ceiling racks, or even a separate warehouse, full of pre-printed cartons, all of which have to be organised, monitored, and picked through for acquisition when needed. Managing such a large amount of material can be challenging based on the number of brands, products, regional customer requirements, and SKUs a facility handles. Basically, the more unique cases there are, the more space is necessary, which increases the challenges related to the logistics of ordering and labour-related consequences of stocking.

Though pre-printed corrugated cases may appear inexpensive, when the cost of storage space, inventory, and handling are added, the true cost is often surprisingly high. The space used for storing pre-printed cases could be used for more profitable purposes, such as added production capacity.

In addition to the space required for storage, there is the consideration of obsolescence. What happens to all those pre-printed cases when a product line is discontinued? Or a listed ingredient changes? Or they contain text or logos for seasonal promotions or products that are no longer being produced? These will need to be scrapped and the associated cost factored into the production process.

The alternative: In-line, variable data printing

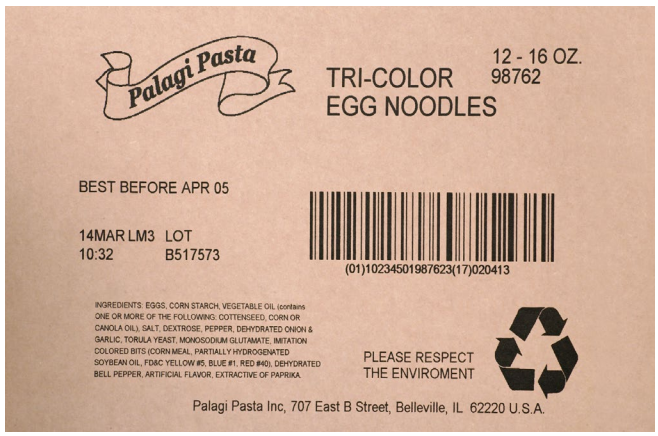
Today's high resolution case coders are capable of printing high quality information including logos, bar codes, and small text reliably, at high speeds, and with variable information on each case. This allows organisations to reduce, or even completely eliminate, the number of pre-printed cases they use.

A typical system consists of two to six high-resolution (150 dpi or more) case coders, networked together. The number of coders depends on the height of the information printed and whether the box is printed on one or two sides. A common print height for high-resolution case coders is 50-70 mm (2.0 – 2.8").

Because case coders are digital printers, variable data can be printed at the same time as the unchanging information. Thus, there is no need to apply labels with ingredients or stamp a date or lot number.

Unlike pre-printed cases, inline coding provides enormous flexibility. Messages are quickly changed, and new messages can be created and stored for immediate or future use. The printers are very compact and take up minimal space on the production line. They can print logos, graphics, large and small text, and a wide range of linear and 2D bar codes, including the increasingly popular GS1-128 bar code. State-of-the-art printers feature the ability to automatically purge ink through the printhead before every print, ridding it of contaminants to provide consistently clear, high-resolution codes.

Pre-printed logos and company data. Label with ingredient listing. Variable information printed in-line with inkjet printer.



All information printed in-line with multiple high-resolution inkjet printers.

Benefits of in-line printing

The key benefits of moving from pre-printed cases to an in-line case coding solution are:

- Reduced storage space: Due to different brands and products, many organisations have multiple types of pre-printed cases of the same size. If all information is printed in-line, only one plain case type is needed per size. This can result in dramatic savings in floor space and storage cost.
- Reduced case inventory: Besides large amounts of floor space, pre-printed cases also tie up significant amounts of working capital (inventory costs). In-line printing on plain cases reduces these costs in two ways: the total number of cases will be significantly lower and the cost per case is less since they don't require printing.
- Less carton obsolescence: Pre-printed cases with "old" variable data, due to a defunct product line, a major brand change, seasonal requirements, or a promotion that ended typically are scrapped.
- Improved equipment performance: Long-term storage of corrugate can degrade the material over time and cause its performance to suffer. Previous studies of case erecting and handling equipment have shown that "fresh" corrugate cases perform better. Fewer jams, better throughput, and simplified setup all lead to more uptime, production, and profit.
- Reduced changeover time: By using generic cartons, the changeover time between products is reduced. The cases are only changed when a different size generic case is required. Print messages can be changed in seconds. A line can be ready for coding different products in a few minutes or less, increasing production throughput.
- Increased uptime: Currently, case changes often delay the start of a production line. Finding the correct case, loading it in the case erector, and adjusting the equipment all take time. With in-line case printing, it's as simple as changing the message to be printed,and you are ready for production. No delays, no searching the warehouse for the cartons you want and waiting for them to be delivered to the production line.

The most important result of all the benefits listed is cost savings. Substantial savings can be realized when companies switch to an in-line printing strategy versus relying completely on pre-printed cases. For example, a large food manufacturer with multiple locations around the US had a payback of less than 12 months in one facility by switching to an in-line case coding strategy.

Are there drawbacks to in-line printing? Of course. Case coders can only print in one colour (usually black), and although the resolution is for most purposes more than sufficient, it is lower than the resolution of flexography and offset printing. So if the marketing department insists on an ultra sharp blue and gold company logo, pre-printing is the way to go. However, even in that case, your best option might be to pre-print only the logo, and use an in-line case coder to print all the other information. That way your marketing department is happy, and you are still able to reap the benefits of significantly reduced inventory, storage space, and overall costs, as well as increased flexibility.

Example

A simple example illustrates the benefits of moving to in-line case coding to replace pre-printed cases. In this example, the ABC Company has 40 types of pre-printed cases (SKUs), and two different case sizes. Assumptions used in this example are:

- Each SKU requires 64 square feet of storage space at a cost of $10.50 per square foot
- For each SKU 150 cases are scrapped each week at a cost of $0.03 per case
- For each SKU there is one changeover per week. Each changeover requires 10 minutes of labour at $15 per hour.

Reducing the SKUs by direct in-line printing saved them almost $40,000 per year.

Annual Cost (USD)	Cost per SKU	Pre-print		In-line print	
		SKU's	Total	SKU's	Total
Space	$672	40	$26,880	2	$1,344
Scrap	$225	40	$9,000	2	$450
Changeover	$125	40	$5,000	2	$250
TOTAL COST			**$40,880**		**$2,044**

Savings = $38,836

The example only shows the direct, obvious savings. In addition to these, there are several other areas of real savings that the company realized, such as higher uptime due to a re-duced number of changeovers, and improved throughput. Costs for implementing in-line inkjet printing will vary based on the number of production lines, amount of data being printed, and number of production shifts. In many cases, the payback period for an in-line printing system is one to two years.

For today's producers, keeping up with the constant changes and mounting pressure for expense reduction is daunting. To stay competitive, decreasing working capital and costs along with increasing flexibility are of prime importance.

There are many ways to meet these objectives, but considering an in-line printing strategy can be a major contributor, by providing consistent high quality and eliminating concerns about where to store pre-printed boxes for that new product line. Deciding whether such an in-line printing strategy is right for a company is fairly straightforward when you understand the implications of your current situation and the alternatives which exist.

Printer specialists who have the experience reviewing all factors, including those that aren't readily apparent, can be very helpful. They will be able to recommend the best solution that will fit both current and future needs.

Peace of mind comes as standard

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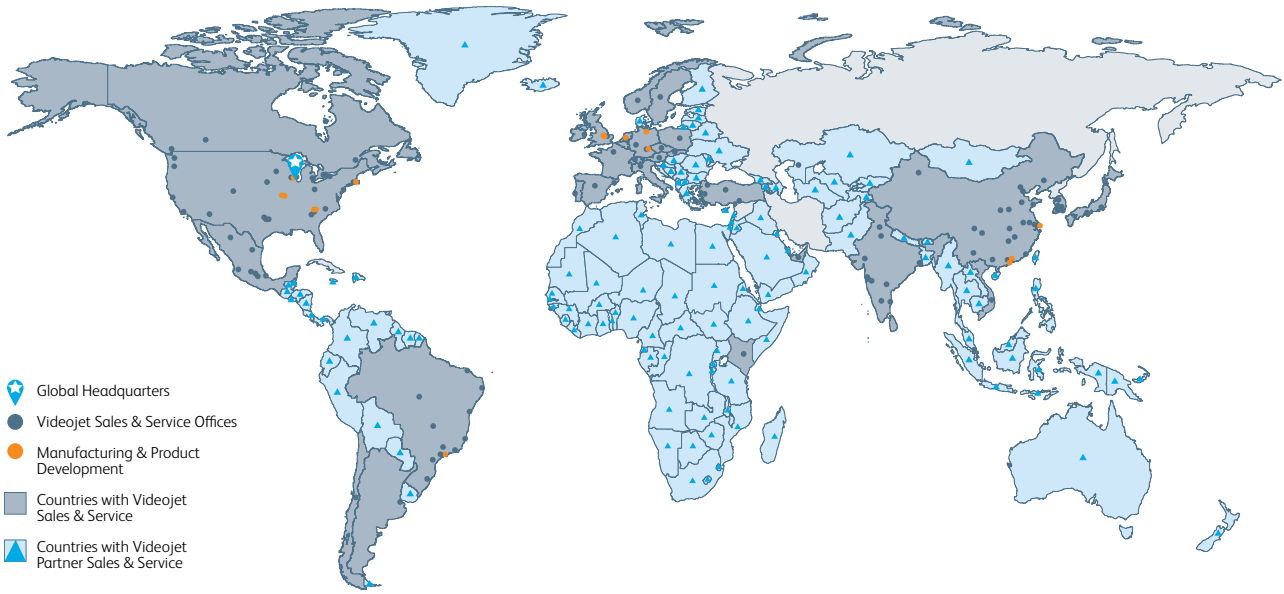

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