



White Paper



BATCH PRINTING SOLUTIONS FOR MEAT PROCESSORS

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1 Introduction

The meat processing industry in the United Kingdom is expected to grow at an annual compound rate of 2.3% over five years through 2016-17¹.

The retail sector remains highly competitive which puts pressure on profit margins for meat processors. Companies are therefore focusing on creating differentiation in their packaging – several have launched packs that reflect the heritage of their businesses and products while at the same time also conveying modernity and innovation². There have also been introductions to increase shelf-life and improve the appearance of meat products on-shelf³.

Environmental concerns are another area that has influenced the development of meat packs. This includes new materials, such as the switch from PP to PET and the incorporation of post-consumer recycle⁴, and solutions to minimise food waste, for example split packs that offer portion control and help keep products fresher for longer⁵.

Consumer demand for quality and responsibly-sourced products remains strong; Red Tractor Week 2017 promoted quality farming and reliable practices⁶. The Red Tractor scheme is the largest of its kind in the UK and covers animal welfare, food safety, traceability and environmental protection.

This focus on quality is also reflected in the emergence of a trend known as ‘flexitarianism’⁷. This is where consumers choose to adopt a more flexible approach to their diet, avoiding meat for some meals but then treating themselves to a high-quality product for when they do eat meat.

Trading conditions for the sector remain tough. A recent report identified 55 meat processing companies in financial difficulty, an increase of 10 since 2014⁸. The need for quality therefore has to be balanced with a drive to maximise efficiencies and productivity.



2 The role of the printed code in meat packaging

Packaging helps to establish the appropriate image for meat products and to maintain their freshness and quality. As part of this, the provision of printed variable information, such as use-by dates and batch data, already plays a small but vital role, meeting relevant food safety and quality legislation, national and international accreditations, and retailer requirements.

Nevertheless, how these printed codes are produced and presented can also make a significant contribution to a business’s overall success in competitive markets.

2.1 Improved brand protection/ compliance

High resolution, long-lasting quality printed or marked codes for use-by dates, batch or traceability data will ensure that meat products satisfy necessary legislation and customer standards, with clear and legible codes that stay in place on all types of packaging materials.

The wide choice of equipment and consumables means it is possible to select a solution for the many different substrates used for meat packs.

For example, for ink jet printing, there are inks available to meet specific challenges such as printing onto chilled, damp or frozen packs, or where there is a light layer of grease. This ensures codes remain legible and adhere to packs throughout the supply chain.



Printing through greasy packaging



Clear, accurate codes



Another way of reducing inadvertent tampering and errors is to transfer messages between machines via USB, with different users assigned different levels of permission to create, select or change messages.



Similarly, automatic code selection is enabled where barcode scanners are linked to printing and marking equipment. Additional protection of message accuracy is delivered where individual or multiple printers can be managed and monitored from a central computer.

2.2 Quality

Clear and legible printed information will complement the finished pack, making sure the codes do not detract from its overall appearance. Non-contact printing methods enable variable data to be printed onto irregular surfaces, while maintaining consistent print clarity.



The ability to print QR codes offers the opportunity to include more information about a meat product's origins, for example details of the herd and where they were reared. This can provide a valuable element of product differentiation, particularly for specialist, premium producers.

Accurate printing into small areas

Printing and marking equipment that operates reliably in chilled environments will contribute to an efficient packing line by reducing unplanned stoppages which delay production. Quality printers designed for food manufacturing environments will prevent water ingress with a stainless steel IP55 enclosure. Tough yet flexible printhead conduits can cope with repetitive actions such as traversing applications, and contribute towards continual operation.

For the particular requirements of marking animal carcasses, laser technology offers a hygienic non-contact solution for permanent readable marks. This provides a more effective solution than traditional branding or manual ink stamping which can often be illegible. Digital coding technologies such as laser coders also have the ability to dynamically modify a printed code using remote fields, allowing the mark to instantly contain batch, herd and farm information.

Quality machines will also offer greater functionality, helping to reduce costs while maximising efficiencies. For example, printers with a carton coding feature have the flexibility to code both primary and secondary packaging with a single machine.

Whatever the printing requirements, errors can be costly in terms of lost time, lost product, the need for reworks and the possibility of a product recall and retailer fine. In fact, the average value of a defective product/work claim in the UK is more than £312,000⁹. Errors can be particularly critical in the meat sector with many perishable and short shelf-life products. Modern printers offer simple message creation and editing with touch screen user interfaces, often using picture-led prompts, and on-screen help. This ensures consistency and reduces the likelihood of mistakes and reworks on the factory floor.



2.3 Productivity

Printing and marking systems can help to minimise product waste and increase manufacturing uptime in several ways:

Increased speed and flexibility

Traversing printheads are able to code across multiple products at high speeds. This is a particularly useful feature for split packs, where information may be required in two separate places.

Versatile printers that can handle a variety of requirements, including multiple lines of text, and human- and machine-readable codes, will enable processors to meet differing standards or regulations. This will help companies satisfy export market requirements, for example FSA regulations such as country of origin information. It also provides a valuable element of future-proofing.

Reducing stoppages

Features such as self-cleaning ink jet printheads will reduce blocked nozzles and maximise printer uptime, while timely and visible notifications of low fluid levels allow refills to be scheduled into planned production line stops.

Planned stoppages can also be minimised through the use of printers with longer service intervals, and self-servicing and self-maintenance functions. Machines designed for use in washdown environments save operators' time by dispensing with the need to cover or remove the printers for cleaning.

Reducing waiting time

For meat processors needing frequent product changeovers, digital printing and marking technology allows multiple messages to be stored. These can then be switched at the press of a button, reducing the time spent setting up new information compared to changing rollers or plates on non-digital machines.

Multiple line settings as well as data held in the printer's memory mean information specific to product lines can be set up and indexed in the machine, making for quick product changeovers.

Lightweight machines that can be moved between lines and set up quickly reduce set-up time and downtime between production runs. They also allow producers to react quickly to changes in customer orders and to be more flexible in their operations.



Reducing waste

Printing and marking systems that combine quality and accuracy will help to minimise waste by ensuring the correct information is printed every time, that it is legible and in the right place on the product. This is increasingly important where the amount of space available for functional information may be decreasing, meaning printers need to apply a code accurately into what may be a small area.

Reducing processes and over-production

Technology which requires minimal start-up procedures and where the first print is as good as the last means there is no need to leave machines switched on permanently, or to run them every day.

Machine versatility, such as the ability to print multiple lines of variable information as well as logos and carton coding all with one printer, will enable manufacturers to use a single model for several applications, printing onto a range of substrates. Less variation in machine types also leads to fewer instructions to learn and a reduced inventory of consumables.

3 Printer selection – factors to consider

Linx's customer research has suggested that the key drivers for printing and marking in the meat sector are code accuracy and legibility, especially for traceability purposes, as well as reliable and easy-to-use equipment that helps maximise productivity.

As part of the selection process, the speed of the line and the substrates to be printed onto are critical. It is important to have each material type sample-printed to ensure legibility, particularly if a range of different colours is involved. Consider also a trial of a printer on your production line, so that it is exposed to your real-life environment and processes.

The overall Cost of Ownership of any new machine purchase should be investigated. This takes into account both the initial price and factors such as reliability and the cost of consumables over the machine's lifetime. Frequent breakdowns can negate any benefits of a lower purchase price. Leasing and rental options may also be worth exploring.



4 The different coding technologies

4.1 Continue Ink Jet (CIJ)

As a non-contact printing technology, CIJ is ideal for meat packaging such as flexible plastic, card sleeves and premium card boxes, as well as pre-printed labels where the coding area may be small. They are supported by a wide range of inks which can print onto almost any material. These include inks of different colours to ensure legibility; food grade inks for applications where the code may come into contact with the product itself; fast-drying inks; and ones that ensure the codes do not rub off, even when there is moisture or grease on the packaging.

CIJ can print from one to multiple lines of text and simple graphics on line speeds of over 7m/s for a single line of code. The compact printhead can be situated above, beside or beneath a production line or traverse from side to side across the line. With lighter models increasingly being produced, the CIJ printer is more capable of being quickly moved from line to line and is fast to install and set up. The technology can provide the ideal solution to enable start-up and growing businesses to move from manual coding to digital printing methods in order to produce the type of quality codes demanded by the retail sector.



CIJ printing onto plastic packaging

4.2 Large Character Marking (LCM)

Case coders are particularly well-suited for printing variable information onto secondary packaging such as cardboard boxes. These outer cases usually require text and graphics which are easy to see.

Case coders can print to a high-resolution quality, and are versatile enough for use on a variety of surfaces and materials. Benefits include ease of set-up and adjustment, reliability and predictable cost of ownership. They are also a cost-effective alternative to pre-printed boxes or labels.



LCM printing graphics onto secondary packaging

4.3 Laser

Laser marking has no ink involved in the coding process and therefore no drying time or risk of smudging. Laser coders are suitable for a wide range of substrates and at high line speeds. Benefits include increased uptime, higher speed capability and the fact there is no use of consumables. The permanence and legibility of the code is particularly valuable for the marking of animal carcasses where poor quality codes risk failing traceability requirements.

Steered beam laser systems are highly versatile as they provide clear, consistent and perfectly formed characters in a variety of fonts and message formats, and enable the use of high quality graphics and logos over relatively large print areas. They are particularly suitable where high quality codes are required, for example to blend in with the style of pre-printed packaging or where a premium product demands a similar quality of printed code.

Laser coders can also cover a large print area and on high line speeds. This makes them suitable for multi-lane printing onto multiple products in one pass, without the need for a mechanical moving printhead.

Advances in technology and efficiency have led to a significant reduction in the initial purchase price, and laser coders deliver low cost of ownership due to no consumables and relatively low maintenance.

A new generation of cost-effective compact laser marking solutions have also been introduced, which offer an affordable alternative to other technologies while still maximising functionality.



Laser marking onto animal carcass

4.4 Thermal Inkjet Printers (TIJ)

TIJ printers provide a flexible printed coding solution for both outer cases and primary packaging. Although having a smaller print area than case coders, they offer high resolution print quality for premium packaging, making them a cost-effective solution for slower production lines or where production is not 24/7.

	CIJ	LCM	Laser	TIJ
Line speed	✓✓	✓	✓✓✓	✓
Print area	✓✓	✓✓✓	✓✓✓	✓✓
Multi-lane printing	✓	x	✓	x
Print quality	✓	✓✓	✓✓	✓✓
Code permanence	✓	✓	✓✓	✓
Ease of integration	✓✓✓	✓	✓	✓✓



TIJ printing onto varnished card

5 Conclusion

As with all purchasing decisions, in selecting a printing solution to suit their needs, meat companies must carefully assess all the available options, with line speed, code content, the production environment and total cost of ownership important factors to take into consideration.

With new pack materials and formats emerging, the ability of the printer to deliver clear, robust codes of varying complexity, at different points on the production line and onto the widest range of substrates, may provide a vital element of future-proofing.

Printers with washdown capability and traversing printhead functionality can help deliver the reliability, versatility and production efficiencies needed. In this way, they will ensure that every code meets the necessary compliance with the right level of quality in order to help support that all-important brand reputation.

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