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INNOVATIVE SOLUTIONS Marking & Coding Guide

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How to Boost Efficiency and Reduce Waste with Automated Case Marking

Your end-to-end guide to secondary package marking

AN EBOOK FROM MATTHEWS MARKING SYSTEMS

INTRODUCTION

It's important to periodically evaluate your approach to marking and coding. Research shows that unplanned outages can cost a consumer packaged goods (CPG) manufacturing company an average of $260,000 an hour. Production efficiency and uptime is only as good as your weakest link, and you want to avoid having that weak link be your marking solutions.

In a perfect world, most CPGs hope their marking solutions are a "set it and forget it" proposition with the right marks "automagically" appearing on the right products, cases and cartons time after time.

In the real world, however, production lines and packaging shapes and sizes are constantly changing and evolving. Marking and coding equipment gets old and obsolete, and perhaps you just keep putting up with quirks and the occasional failure because, well, that's the way you've always done it.

WHAT DO WE MEAN BY CASE CODING?

Manufacturers of national brand and private label consumer packaged goods and their packaging facilities — whether in-house or outsourced to co-packers — print a variety of different graphics, text, marks and codes on every level of packaging.

At the secondary packaging level, this can include a stretch-wrapped tray of 24 soda cans, a cardboard box that holds four pouches of dried soup mix, or a multi-pack of eight rolls of paper towels. It can also refer to a corrugated fiberboard regular slotted case (RSC), or simply case, used to pack products for shipping, storage or distribution.

Regardless of the type of secondary packaging, it all needs marking to accurately identify case contents, both with human readable marks and barcodes/2D codes, and to support your brand with logos and graphics.

To keep pace in today's world, however, the "good enough" approach is a recipe for falling behind the competition.

It's vital to periodically evaluate your approach to marking and coding and explore how the latest technologies can help you improve efficiency, minimize marking-related line stoppages, reduce waste and lower TCO, or accommodate new packaging substrates and requirements. If it's been a minute since you've evaluated your case/carton or secondary packaging marking solution, you've come to the right place for on-the-mark strategies and insights as we do it better than anyone.

TAKE YOUR CASE MARKING TO THE NEXT LEVEL.

Even though you are already doing case and carton marking, it's important to explore what more you could be doing to improve quality, sustainability and traceability. Here's how to set yourself up for success.

- **Automation** - In today's world, marking and coding automation is almost table stakes. Are you using vision systems, verifiers and sharing information across your product line to automatically place the right marks in the correct location without error? If not, this is a great place to start.
- **Branding** - Could your logo and other graphics be larger and more vibrant? Modern inkjet printers can easily produce high quality, large marks that make you stand out from the crowd. Small, barely visible marks are a thing of the past.
- **Traceability** - Consumer interest in product sourcing is at an all-time high. The use of 2D barcodes on cases and cartons lets you put important details about the contents within, even without access to back-end data. When marking meets automation, better traceability comes along for the ride.
- **Reliability** - Carton/case marking solutions should be able to survive a broad range of environmental conditions, ranging from... **DOWNLOAD THE FREE GUIDE FOR MORE.**

Factors to Consider When Selecting a Marking System

How to Find the Right Solution For Your Production Requirements

BY KEVIN HAVRE, GLOBAL PRODUCT MANAGER AT MATTHEWS MARKING SYSTEMS

1) What are the most important aspects to consider when selecting a package marking/printing system?

A variety of factors need to be considered when deciding on a marking system for your packaging. For starters, you'll need to know if the marking system can meet your production requirements for the following:

- Your line speeds
- The distance to the packages from the conveyor or production line (i.e. throw distance)
- The substrate of your packages (porous or non-porous)
- What type of mark you need to make (alphanumeric text, barcode, 2D code, etc.)
- Your environment (temperature, humidity, dusty, etc.)
- Desired automation and connection with business data systems
- Operator ease of use/ease of maintenance
- Reliability / uptime

2) What are valve-based inkjet printers?

Valve-based inkjet printers (also known as valve-jet) are a proven marking technology for virtually any substrate used in almost any environment. Unlike thermal inkjet and piezo inkjet printing, valve-jet printers use a series of valve-controlled jets to pressurize ink and then fire individual drops on your substrate. This enables valve-jet printers to have a greater throw distance to the substrate. Additionally, these systems are incredibly robust and can withstand harsh, challenging environments that challenge other types of inkjet printing/marking.

3) How does the technology differ in drop-on-demand valve inkjet printers versus other options?

Drop-on-demand valve inkjet printers are ideal for simple, bold alphanumeric characters where speed and reliability are paramount. Two other popular technologies used for printing/marking are thermal inkjet (TIJ) and piezoelectric inkjet. TIJ uses heat to pressurize ink in a cartridge which causes a bubble to form. The pressure from the bubble causes the ink to fire from the cartridge (printhead) and

onto your substrate.

Piezoelectric inkjet printers use electrical charges and vibrations to send droplets of ink onto a substrate. The electrical charge excites a crystal or ceramic element in the printhead which oscillates ink into droplets before they're fired through a nozzle.

TIJ and piezoelectric marking systems are good if your packages will run close to the printhead on the conveyor, that is a short throw distance. Both typically deliver higher resolution relative to valve-jet marking, which is important if you're printing barcodes or similar. However, valve-jet printing is ideal if your packages aren't in the ideal throw range of either and you're not concerned with high resolution barcodes and the like. If you need a highly reliable, robust marking system that delivers a lower cost per mark than other technologies, then valve-jet is a perfect solution.

4) Which packaging applications are best suited for valve inkjet printing systems?

Valve-jet printing is ideal for a wide variety of packaging applications. It typically excels in challenging environments (i.e. corrugated dust) where a TIJ or piezoelectric inkjet solution would struggle to print. If the throw distance needed to mark your packages is greater than 5-6 mm or you need to mark alphanumeric characters, a valve inkjet solution is perfectly suited for making your mark. Additionally, if your packages are of different heights/widths, valve-jet can withstand the movement of mechanical arms or mounting apparatus', thereby not limiting you to static mounting.

They offer a range of advantages, including fast and reliable operation, low maintenance requirements, and minimal waste production. These print systems can be used to mark a variety of substrates, from cardboard boxes to plastic wrappers. Valve inkjet printers are highly useful for simple, bold alphanumeric marks. They can also be used to create promotional or informational messages on packages and cartons.

5) Why use drop-on-demand valve inkjet printers for alphanumeric marking?

Drop-on-demand valve inkjet printing is the ideal choice for alphanumeric marking because it offers several distinct advantages. With this method, multiple jets of ink are precisely directed onto the substrate surface without contact with the printhead. This feature provides superior accuracy when printing numbers, text, or simple logos. Additionally, the ink is applied in a consistent, controllable manner and can be used to produce marks with minimal bleed. Furthermore, drop-on-demand valve printing eliminates many of the maintenance concerns associated with other marking systems due to its simple operation and low resource requirements. All these features combine to make it an ideal choice for alphanumeric marking.

6) What are the signs indicating it's time to replace an existing printing system?

Red flags that indicate it's time to replace your existing printing system include:

- Spending more time dealing with issues and less time printing
- Spending more money than usual on repairs or replacement parts
- Package marks and codes are no longer recognizable

- Inability to meet customer orders due to a lack of printing capacity or speed
- Package marks and codes are not compliant with industry regulations
- Your package printing system is no longer being supported by its manufacturer.

Overall, if you're experiencing any of the issues above or feel like your existing package printing system is no longer meeting your needs, it may be time to consider investing in a new one. By replacing an outdated system with a modern solution, you can improve both the quality and efficiency of your package printing operations.

7) What pain points can valve-based inkjet printers address?

Valve-based inkjet printers can address a variety of pain points related to carton and package marking. For one, these printers are designed for marking on substrates that are difficult for other types of inkjet printers, especially when operating in challenging environments. They typically offer faster speeds comparatively, allowing you to successfully mark your packages on a fast-moving production line. These printers are also highly reliable, you're sure to get consistent results every time your package is marked. Finally, valve-based inkjet printers are cost-effective and require minimal maintenance, making them an ideal choice for improving the bottom-line efficiency of your production operation.

8) Aside from printing and the resulting mark, what other factors should be considered when deciding on a system (solution?)

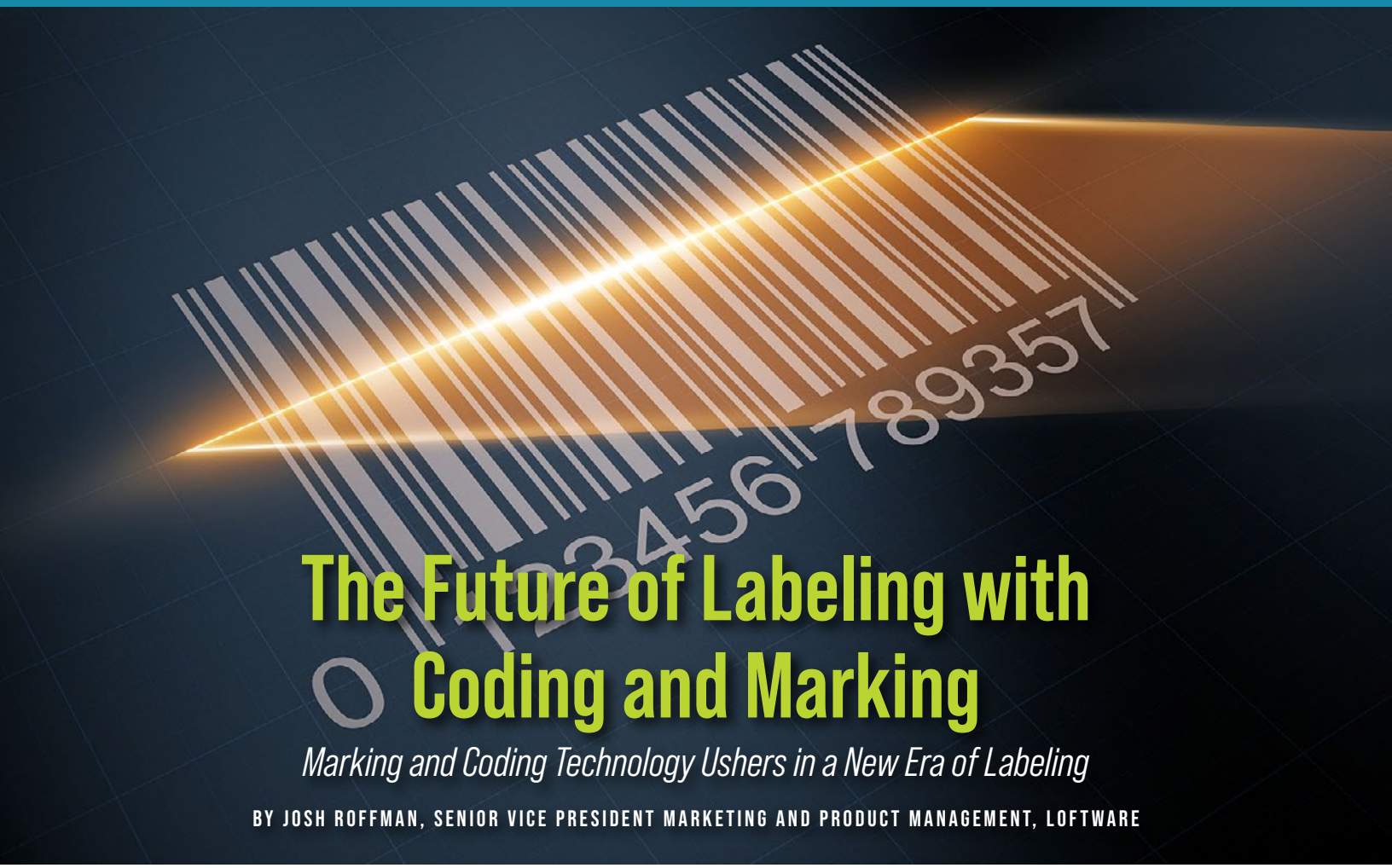
Here are additional factors to consider when thinking about the system you'd like to deploy:

- Is the solution scalable?
- What type of training will be needed for operators, managers, and others?
- Will your production line need to be extensively modified?
- Do you need both simple alphanumeric marks on one set of packages and traceability data on another set of packages?
- Do you need to connect to your ERP or a backend database?
- Will you need to control third-party equipment, including other marking technologies?
- Do you have overarching OEE goals you're trying to reach?

9) What should businesses consider when selecting a supplier for a printing system?

When selecting a supplier for an industrial printing system, businesses should consider several factors to ensure they make the best choice. First, they should consider the quality of printers offered and determine whether they can meet their needs in terms of reliability, speed and accuracy. Second, it is important to check if the supplier has experience with similar projects or industry requirements; this will help to ensure that the printer is suitable for the job. Additionally, businesses should consider after-sales support and maintenance; reliable customer service can be invaluable when dealing with potential technical issues or questions.

Matthews Marking Systems offers a variety of reliable printing systems that can provide the speed, accuracy and reliability for your production demands. Our expertise also includes creating specialty inks and custom engineered systems. We have significant experience solving the most challenging marking and coding problems across product types, applications and industries. ***Contact us for a free consultation.***



The Future of Labeling with Coding and Marking

Marking and Coding Technology Ushers in a New Era of Labeling

BY JOSH ROFFMAN, SENIOR VICE PRESIDENT MARKETING AND PRODUCT MANAGEMENT, LOFTWARE

The last few years have illustrated that manufacturers need to be agile to navigate today's dynamic market, which is being shaped by supply chain challenges, regulatory changes, and increasing consumer demands. Today, orders need to be accurate, personalized, and customized to specific needs, as well as processed and delivered faster than ever.

To keep pace with these trends, global manufacturers are increasingly recognizing the importance of moving away from their disparate labeling applications and adopting a centralized and cloud-based solution. This enables them to drive all their print devices from an all-in-one digital platform, with coverage ranging from marking and coding production devices to supply chain thermal printers. By interfacing with a range of printing technologies, such a labeling solution provides manufacturers with greater agility and the ability to scale. In addition, manufacturers do not have to spend time swapping out their production lines or replicating data – saving both time and resources.

A PIVOTAL TIME FOR THE INDUSTRY

Given today's volatile markets, companies of all sizes are looking to expand their digital transformation programs in order to optimize costs and gain a competitive advantage as they look ahead to 2023 and beyond. As part of this, manufacturers are seeking an all-in-one digital ecosystem that can bring products to market quickly, efficiently, and more competitively. Within this context, marking and coding is emerging as a crucial technology for modern businesses.

According to our company's annual research, 78% of businesses believe that requirements for marking and coding technology will increase over the next three years, while 96% see an advantage of using a single platform to support thermal transfer as well as direct marking and coding.

BENEFITS OF MARKING AND CODING

Marking and coding devices – which provide the ability to print on almost any surface by using lasers and sprays – are deployed across a range of sectors, including food and beverage, pharmaceutical, and consumer packaged goods. Everyday examples include barcodes, serialization codes, and expiration or 'best by' dates. Ultimately, the purpose of marking and coding is to keep everyone in the supply chain informed about the product by providing details on its source, legitimacy, and freshness. There are several benefits that come with this.

First, marking and coding helps manufacturers meet traceability requirements – a capability that is crucial in cases when products need to be recalled and during times of supply chain disruption. When a complaint arises over an individual product, manufacturers can quickly retrace the steps of the product to identify shipments and lots that may also need to be recalled. As companies face growing pressure from governments, consumers, and stakeholders to share accurate information about the origin of materials and ingredients in products, the traceability afforded by marking and coding has become even more of a necessity.

Secondly, marking and coding can be used to prove the authenticity of a product, which is particularly relevant across the medical device, pharmaceuticals, and luxury goods sectors. Retailers, customers, and anybody else in the supply chain can easily trace the product back to its place of manufacture to ensure that it is authentic and safe for use, sale, or transportation thanks to marking and coding.

Combatting counterfeit items is critical for brands as they seek to prove the authenticity of their products. In 2021, Amazon alone identified, seized, and appropriately disposed of over 3 million counterfeit products targeted for sale to consumers. Counterfeits are a risk to e-commerce players, manufacturers, and consumers alike, and the global anti-counterfeiting packaging market is expected to grow by 45% between 2018 and 2026.

Thirdly, and perhaps most recognisably, marking and coding provides information on the freshness and expiration date of a product. This is clear in the food and beverage sector, where "best before" and "use by" dates are used by consumers to know whether a product is safe to eat. In this capacity, marking and coding assists customers in getting the most out of their shopping basket and aids with decreasing food waste.

EMBRACE TECHNOLOGY TO FUTURE-PROOF YOUR BUSINESS

Once operated as "closed-loop systems" with disconnected, purpose-built software for different devices, marking and coding devices were primarily manual and had limited automation controlling the workflow. As a result, operators had to manually enter information, which made the system prone to errors.

However, the labelling software space is undergoing an exciting transformation as manually operated, disconnected printers get connected, integrated, and controlled by intelligent systems. Now companies can utilise a standardised and centralised platform for all their labelling requirements, which offers integration capabilities to manage output for all their devices from thermal and colour laser printing to marking and coding devices, visual inspection systems, serialisation solutions, and more. By adopting such a solution as part of a cloud-first strategy, businesses will gain printing flexibility, accuracy, and efficiency to improve their bottom line and support global growth.

Josh Roffman is the Senior Vice President Marketing and Product Management at Loftware. He specializes in the impact of supply chain trends on enterprise labelling and directs Loftware's product strategy. Learn more at www.loftware.com.

The Future of Marking & Coding: The IIoT and the Metaverse

BY NATHAN DUBE, DIGITAL MARKETING SPECIALIST AT INDUSTRIAL PACKAGING

Marking and coding technology has been a significant part of the packaging industry's rich history for many years now. But the technological advances that have yet to be seen as we enter into industry 4.0 will almost certainly be the most exciting evolution in these technologies thus far. As coding and marking have become more advanced through cutting-edge printers, labelling equipment, and newer devices such as laser engraving machinery, this ecosystem has moved beyond simple inkjet printing. However, the expansion of the ability to mark and code in new and exciting ways such as laser engraving a dynamic QR code directly onto a metal container is just the tip of the iceberg.

Until now, marking and coding machinery was operated by a machinery operator using a control panel or, more recently, an LCD screen. The machinery is run by an onboard computer run via the touch screen. But those days are coming to an end thanks to the IIoT.

WHAT IS IIOT?

Now, you may be wondering, what is the IIoT? Before we can answer that question, we must identify its precursor, the IoT. The IoT (Internet of Things) is the digitally connected network of smart objects (phones, computers, coffee makers, stoves, and other items connected to the internet).

Smart objects are any physical objects that feature processing capabilities, software, and other technologies that allow for the exchange of data with other smart devices, machinery, and digital systems over the internet via TCP/IP (IP standing for "Internet Protocol").

The IIoT takes this concept a step further as the "Industrial Internet of Things." The IIoT is the future of complete atomization through the implementation of smart packaging machinery such as collaborative robots and artificial intelligence.

When all the machinery in a warehouse is connected via the internet, it can be controlled remotely. The data they collect and produce will be stored via cloud computing, and devices (such as marking and coding equipment) can be run from anywhere with an internet connection.

The further evolution and implementation of advanced artificial intelligence will eventually allow smart packaging machinery to continually record, analyze, update, and improve upon key performance indicators resulting in an ever-improving supply chain. And this is good news considering the detrimental effects that the COVID-19 pandemic brought upon the global supply chain, which is still currently recovering from that unexpected black swan event.

With the looming shadow of the pandemic still lingering as numbers of variant cases continue to rise in various hot spots, the idea of automation for both progress and, more importantly, safety is becoming front and center for many packaging companies worldwide.

Here, we may glimpse at the next

great leap in not only marking and coding equipment operation but all packaging machinery and robotics. I am, of course speaking about, the metaverse.

BUT, WHAT EXACTLY IS THE METAVERSE?

"The metaverse is a fully functional digital realm that exists beyond our own physical reality. The future culmination and integration of the fragmented virtual worlds will converge all digitally enhanced physical reality and physically persistent virtual or augmented spaces. Essentially, the metaverse is the future sum total of all virtual and augmented realities and the interconnections between those spaces and our physical world via the "internet of things," according to a blog post on Indsutrialpackaging.com.

To simplify, the metaverse is the next great evolution of the internet. According to various corporations and futurists, people will shift from tablets, phones, and computers to virtual reality headsets and augmented reality goggles to access the internet.

When (and if) the metaverse comes to fruition, using the internet will be much more similar to playing a video game in which websites are three-dimensional virtual spaces, buildings, towns, and cities.

When it comes to running, updating, and improving the operation and key performance indicators of marking, coding, and essentially all fully automated packaging equipment, operators will be able to run or monitor these machines virtually over the internet from any location they desire.

This next remarkable evolution in internet technology will allow people to run their packaging lines from the comfort of their own home, an office, or perhaps, the beach!

When will the metaverse arrive, and more importantly, will it arrive? Many CEOs of major corporations such as Facebook's Mark Zuckerberg, are betting on it and investing millions in developing this future virtual space. However, only time will tell if or when the metaverse will come to fruition.

The IIoT is the future of complete atomization through the implementation of smart packaging machinery.

The metaverse being brought into packaging automation could look much more similar to playing a video game in which websites are three-dimensional virtual spaces.

Nathan Dube is a professional writer, blogger, and content manager specializing in text, audio, and video production as well as voice acting. He hosts the industrial packaging podcast and produces the animated web series Industrial Packaging, an edutainment cartoon helping people to learn about packaging machinery and materials.