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technology update

Choosing the right coding and marking technology

A careful equipment evaluation can make the difference between an efficient, successful operation and one that suffers from downtime, resulting in unhappy customers. Here's a look at key factors to consider.

Examples of clear, concise codes on a plastic medicine bottle and a paperboard carton, far left, produced by lasers that make permanent, highly readable codes on a variety of substrates. Above, a thermal-transfer overprinter (TTO) codes flexible film webs that will eventually become cough drop bags. TTO also works well on flexible packs for frozen vegetables, left.

By Chuck Ravetto, Product Manager, Videojet Technologies, Inc.

Marking and coding may not be high on your list of priorities, until you get a project that uses new packaging materials or has new customer requirements. For example, the customer now needs to use permanent codes or the marks need to be legible. Then it becomes crucial to know all of your options before choosing the right technology.

Careful analysis can make the difference between a successful, efficient operation and one that experiences needless downtime, resulting in unhappy customers. Key factors to consider include:

- Types of materials or substrates you'll be marking

- Desired speed of application or throughput
- Print quality—permanence and readability
- Upfront investment your company is willing to make
- Total cost of operation, which includes cost for service and for consumables such as ink and ribbons
- Whether variable data, graphics and bar codes are needed

Once you know these factors, it will be easier to choose which marking and coding technology is best for your application. Laser coding, thermal-transfer overprinting (TTO) and binary-array ink-jet printing are all options that have benefits for different applications. Here's how each technology fits into the increasingly diverse industry of package marking and coding.

Laser, TTO and binary-array ink-jet printing all have benefits for different end uses.

Laser coding

Industrial laser marking started in the early 1970s and has since developed into a well-established technology. Today, laser marking and coding are used in production lines throughout the world. They can be used for marking numerical codes, 2D matrix and bar codes, logos and symbols onto labels, sleeves, glass and plastic bottles, cans, kegs, tubes, blisters, paperboard, tubular films and caps.

Lasers require no ink, stamps or ribbons to generate a code. In modern, sealed-off CO_2 laser coders, such as the Focus™ Series from **Videojet Technologies (www.videojet.com)**, infrared laser light is generated via radio-frequency discharge in a carbon-dioxide gas mixture. The CO_2 laser systems code thermally by changing the surface color (e.g., polyvinyl chloride packages), melting, foaming (e.g., polyethylene terephthalate bottles), or removing the material surface (e.g., printed labels, paperboard, cans, tubes).

Advantages of laser coding include speed, versatility, code permanence, noncontact operation, clean and dry process, maintenance-free operation over thousands of hours, extremely low operating costs, and adaptability to a fully automated line. Lasers also offer unsurpassed reliability in no-code/no-run operations. That means if it's mandatory to code the product prior to distribution, production will stop if a product is incorrectly coded. Halting production can be very expensive and most companies will do everything to avoid it. The unequaled uptime of a laser coder and its extreme productivity result in cost savings for a variety of applications.

Thermal-transfer overprinting

Thermal-transfer overprinting (TTO) features a thermal-transfer printhead and ribbon that makes contact with a flexible substrate, such as synthetic films and plastic labels. Miniature print elements under a glass coating heat small areas of the ribbon and transfer ink to the target substrate. Print elements are controlled to create real-time images, including high-resolution bar codes, text and graphics. TTO systems are able to address applications in both continuous- and intermittent-motion.

Maximizing uptime and ribbon use are the keys to success with TTO, and some methods of doing so are more effective than others. Some systems continuously monitor ribbon tension to avoid ribbon-related faults, such as real or "false" ribbon breaks that can interfere with production. TTO systems that use clutch-based ribbon drives cannot as effectively accommodate fluctuations in ribbon tension on control spacing between prints. As a result, clutch-based systems use more ribbon and experience more ribbon-related faults, which translates into increased downtime and higher operating costs.

Typical applications for TTO are within the snack, bakery, meat and frozen food industries where flexible packaging is common. Such packaging also plays a big part in the retail hardware sector, where items like screws, nails and fittings for do-it-yourself projects are sold prepacked. Many automotive-related companies also prepack small components for retail outlets in the same way. There are also special applications, such as in the coffee and confectionery industries, where generic packaging is used across a wide product range and all product branding and specifications have been added using TTO. This saves companies substantial cost through reduced waste and inventory.

Binary-array ink-jet

Binary-array technology is a form of noncontact, continuous ink-jet printing that uses up to 256 orifices in the nozzle to generate more than 15 million droplets of ink/sec, creating a "curtain" of ink. The printed image is controlled electronically by an on/off (or binary) charge of pressurized droplets of ink. Charged droplets return to the system. The uncharged droplets are used for printing.

Binary-array ink-jet systems print high-resolution bar codes, text and graphics in sizes of up to 2 in. high. This technology is also cost-effective when printing variable information in high volume, reducing inventory of preprinted package variation and generating images that look better than those from other ink-jet or laser technologies. Binary array has low running cost compared to contact technologies, can print graphics and variable information, prints on a wide variety of substrates and works with web or sheet-fed applications.

Applications for binary-array ink-jet printing include printing variable information on preprinted chipboard folding containers and paper labels; personalizing promotional packaging; security forms and serializing, lottery and gaming; plastic bottles; and compact disc jackets with the artist's name and serial number.

Making the choice

Careful consideration of the application—materials to be marked, requirements for permanence and readability, anticipated line speeds and operating costs—is the first and most important step toward determining the right marking and coding technology for your company's needs. From there, supplier representatives can assist in taking the next step in examining the features and costs of specific laser coders, thermal-transfer overprinters, binary-array printers, and even standard ink-jet printers. Once all these issues are factored in, actually choosing a marking and coding system becomes the easiest step of all.

More information is available:

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