



Laser marking considerations for cosmetics, personal and home care producers

Achieve higher uptime, reduce maintenance, and improve mark legibility



Laser marking technology — a great option for optimal code quality and permanence.

This white paper is intended to help dispel many of the myths surrounding laser marking on HDPE bottles, containers and glass as well as the integration of laser marking into cosmetics, personal and home care production lines.



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Meet the demands for more accurate and legible product identification

To keep brands at the forefront of customer preferences, cosmetics, personal and home care manufacturers are constantly innovating new products and packaging designs.

While driving growth, these innovations create coding challenges such as marking or coding on more colorful and intricate packaging designs. Leading in this market requires addressing these challenges while improving efficiencies and eliminating production mistakes.

The importance of container materials in laser marking applications



Laser marking is growing in popularity among cosmetics, personal and home care product manufacturers because of its high quality, permanent codes.

Among the more common myths, some have believed that laser coders are fundamentally difficult to use with today's packaging lines. Other myths include the mistaken belief that lasers are challenging to integrate or simply incapable of marking on multiple items simultaneously. New laser solutions dispel these myths and provide greater flexibility to today's packaging professionals.

Obviously, the container material is selected based upon the product, the anticipated customer use, and your company's marketing needs. The laser coder selection needs to incorporate this material as the primary selection factor. And like other production equipment, factors such as line speed, throughput, and required mark content and size also dictate the optimum laser selection. Not unlike different inks in an ink jet coder, lasers can be selected with a given wavelength, energy (beam) source,

and power output level which combine to produce different results depending on the given container material and production line factors. The right coding and marking partner can help your team select the best laser solution for your application including laser type, wavelength, power, lens and marking head. It is worth considering working with a partner that offers a broad range of laser types, power outputs, and wavelengths to assure you have the full complement of options from which to choose. Like all coding and marking applications, it is critical that a specialist from your laser solutions provider performs testing to identify the best solution for your specific application.

Overt coding solutions

Visible, clear, and permanent codes with laser marking systems.



Visible codes are an important layer of defense against counterfeiting and diversion.



Ideal overt codes are permanent to prevent removal by unauthorized parties. Laser marking systems can provide high quality permanent codes on many package types.

How laser marking systems work

Using an RF signal, carbon dioxide (CO₂) is stimulated electronically inside the laser tube, generating a laser beam. When the laser beam is focused or steered onto the packaging material, by a series of galvo mirrors through a lens, the beam is absorbed and heat develops. Codes marked with the steered laser beam are solidly filled.

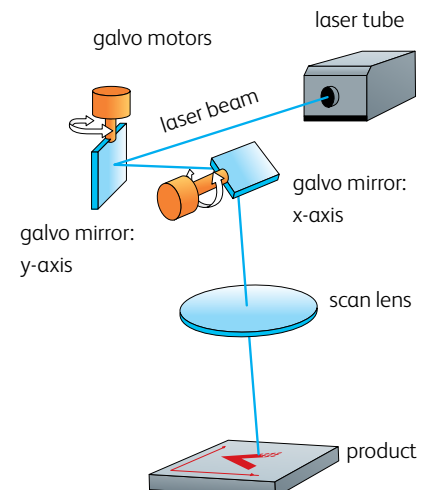
Lasers are ideal for household cleaning products which may require an extremely permanent code, bath and shower products which are used in wet environments, or branded goods which do not want the code to distract from the package design.

Depending on the packaging type, laser technology converts the heat generated from the beam into a mark on the product:

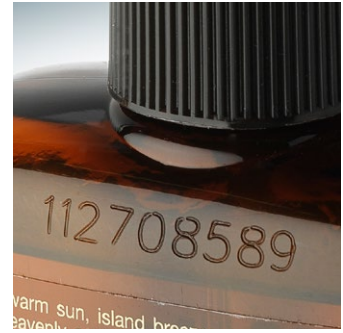
- Color change from chemical reaction
- Engraving from melting, burning or cracking the top surface layer
- Ablation or removal of the surface coating or decorative paint of a package creates contrasting colors

Laser codes are an ideal overt coding solution for brand protection:

- Permanent codes cannot be removed by unauthorized channels
- High quality marks enable clear smart coding techniques and instill brand confidence with customers
- Additional text, logos, bar codes, graphics and other information can be added to enhance protection
- High reliability and price / performance ratio



Marking on HDPE bottles and containers



Laser benefits

Relative to ink-based printing systems, laser marking offers two advantages concerning cleanliness and code permanence. Laser marking does not degrade the overall cleanliness of the production environment provided a fume extractor is used to address any fumes and/or dust from the ablation process. This helps to provide a cleaner production environment and deliver permanent codes on your products using a laser coding solution.

With regards to code permanence, the laser physically alters the substrate and provides a level of code protection for applications where the code may be subject to abrasion.

Integration

Because of the production characteristics of the filling equipment, most bottle and container marking occurs on the conveyance system after filling and sealing.

Marking directly on HDPE

Directly marking HDPE is impractical for consumer-facing identification information, like expiry information, unless a knock-out area or label is used. The marked information is difficult to read because it has a very low contrast against the plastic. It is, however, acceptable for plastic traceability applications.

Marking on labels applied to HDPE

Laser marking on labels applied to the container removes the top ink layer, exposing the base label material resulting in a high contrast, legible mark.

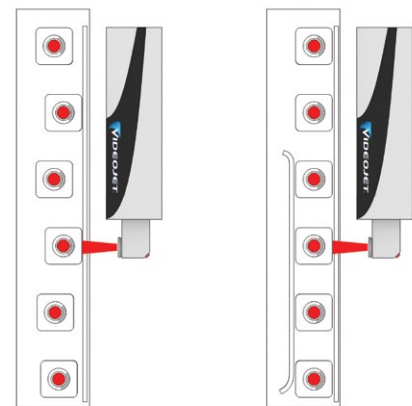
Self-adhesive labeling integration

The best mark legibility and mark placement repeatability is achieved when the laser is integrated into the label applicator and marking occurs while the label is stationary prior to being applied.

Conveyor line labeling integration

Marking on the label as the container is moving on the conveyor is a viable option. However, it's important to remove the variation in production positioning while moving down the table top conveyor.

Excessive side-to-side container movement may move the label in and out of the laser's focal point resulting in sub-optimal mark legibility. It is recommended to guide the containers to one side of the conveyor to better control the distance between the laser and the container.



Positional variation in unguided containers

Consistent positioning in guided containers



Mark legibility on curved or irregular shaped containers

Marking on a curved container can be challenging for other technologies because the effective marking distance changes along the curvature. With laser technology, it is possible to select a lens with a longer focal distance. This distance allows the laser to stay in focus on the material and therefore, accommodate moderate fluctuation in product position and shape.

Marking on sleeves and labels

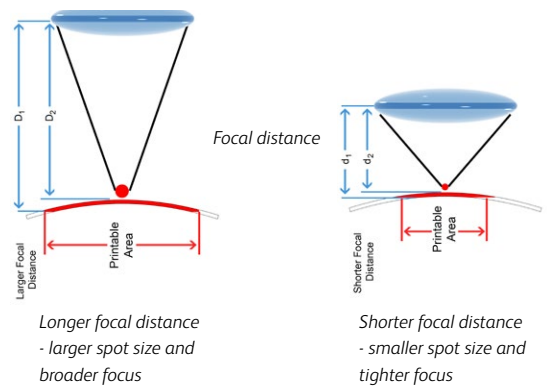
Some producers, following the market trends of product branding, are using sleeves and labels to brand products. In this case, a Datalase™ laser-sensitive patch of ink is applied to the inside surface of the sleeve/label when it is produced. The patch is marked and then the sleeve/label is applied to the container, trapping the marked information between the sleeve/label and the container, which protects it from abrasion and damage. You can also mark on multiple sides of the container with sleeve/label applications.

Sleeve and label marking integration

Sleeves and labels are marked prior to entering the bottling process. Sleeve/label marking requires high-speed lasers because of the higher material speed that occurs after a new roll of sleeves/labels is put into the machine. To meet speed requirements, it is important that producers select a laser capable of printing faster than the average material speed to accommodate material acceleration as a new roll is put into production.

Optics - beam delivery

A larger focal distance accommodates more product curvature.



Laser myths

Laser struggles to mark labels and sleeves at production speeds and is challenged when marking on curved surfaces.

Dispelling the myths

When marking on labels or sleeves, laser can meet typical production speeds, and with the use of Datalase™ inks the marking speed can be increased. With laser's greater depth of field, the optimum marking point can follow the curvature of typical cosmetics, personal and home care containers; producing highly legible marks.

The many benefits of laser marking technology

Marking expiry codes, production information, and batch/lot information is common in cosmetics, personal and home care applications, and typically is required by law.

1.

Continuously imaged material produces characters, logos and bar codes with continuous lines. This greatly improves the mark's legibility.

2.

Mark a wide variety of different text styles to better match your packaging styling. This improves your brand image and improves the consumer's sense of quality in your product.

3.

Permanently mark on a wide variety of materials. This permanence helps prevent tampering of your marked information (to help reflect and support your brand's image) and it is important in traceability applications.

4.

Mark in any orientation, even bottom up, for simple production line integration.



5.

Filters are the only supplies required for efficient laser operation. The costs associated with purchasing and storing consumables, and the operating costs associated with keeping printers filled with consumables are eliminated.

6.

Greater uptime because of less ongoing maintenance and operator intervention.

7.

The lack of fluids and marking consumables can create an overall cleaner operation, which is advantageous in cosmetics, personal and home care production since it helps eliminate the likelihood of ink-related product contamination.

8.

Fewer environmental challenges – laser is more forgiving in your production environment because it isn't impacted by the temperature and humidity changes.

Lasering paperboard produces great looking, high quality marks



Laser benefits

Laser marking directly on colorful paperboard package designs produces highly legible marks. Lasers can mark in any orientation and can mark with fonts that better match your product's branding or other pre-printed consumer information such as ingredient information.

Paperboard cartons are ideal laser marking containers

Lasers will reliably ablate the ink off the carton and expose the paperboard below. Laser ink removal will generate minor particulate debris removable via a filtered vacuum system. Removal of darker colored inks produces higher mark contrast. Water based inks will take longer to ablate because the ink is typically thicker, while solvent based inks are typically thinner and faster to mark.

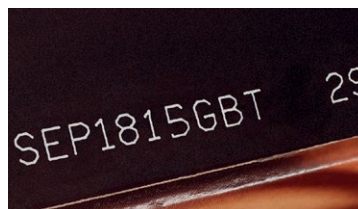
Marking speeds of 50ms for the mark shown above are achievable with moderate power lasers. Both higher mark speeds and lower particulate debris can be achieved using laser sensitive pigments, like Datalase™. These pigments are marked on a specific location on the paperboard and will change color when exposed to laser energy.

Integration

The laser integration location is within the carton filling equipment because the carton's movement is under tighter control, which will produce a more legible mark. Integrating the laser marking system within the cartoner also simplifies production setup and helps protect the laser from accidental damage or misalignment.

Conveyor integration

If carton integration isn't possible, the laser can be integrated downstream on the conveyor. As with all conveyor marking, guiding the carton to a consistent distance from laser helps ensure the optimal mark quality.



Laser mark on coated cardboard box

Laser myth

Laser is fine for simple codes, but it struggles with complex marks at higher speeds.

Dispelling the myth

Complex, multi-line codes are achievable with today's laser marking solutions. However, it is important to work with a laser supplier that offers not only a broad portfolio of lasers, but also a range of lens and marking head options. Interestingly, it is not correct to assume that all lasers of a given power output are effectively the same. In reality, the chosen lens and marking head can dramatically influence the ability of the laser to print the needed code content at the required production speed.



Things to consider when implementing a laser marking solution

Clean operation. Less maintenance. Laser marking fields and the expertise of a trusted partner.

Exceptional reliability and economical to operate

By their very nature, laser marking systems are inherently reliable and typically very low maintenance. However, the biggest enemy of lasers is heat. Heat reduces laser efficiency and shortens life. Our robust laser designs are intended to be ambient air cooled instead of requiring compressed air to cool the laser. These sealed lasers don't require compressed air, which means lower maintenance costs.

Regional customer application and laser specialists

Every application is unique; different materials interact differently with laser energy. When investigating laser's applicability to your specific needs, it's important to test your materials to identify the optimum solution. Videojet laser specialists will help create the best configuration and our test facilities, located around the world, can test and optimize a solution based on your materials.

Larger mark fields mark more items and, by design, allow you to use less lasers and minimize your investment

Industry-leading 24 mark fields combined with high resolution marking heads and multiple different focal distance options allow you to mark more items or to mark longer on moving objects. A laser with a larger mark field can mark more items compared to other solutions that require multiple lasers. Our advanced laser design can mark more information on moving items by tracking each item longer.

The Bottom Line:

Laser marking is a proven and attractive option to help you enhance operational performance while meeting the growing production demands of your cosmetics, personal and home care operation.

Videojet, the industry leader, offers exceptionally reliable and easy-to-use laser marking systems that provide superior mark quality.

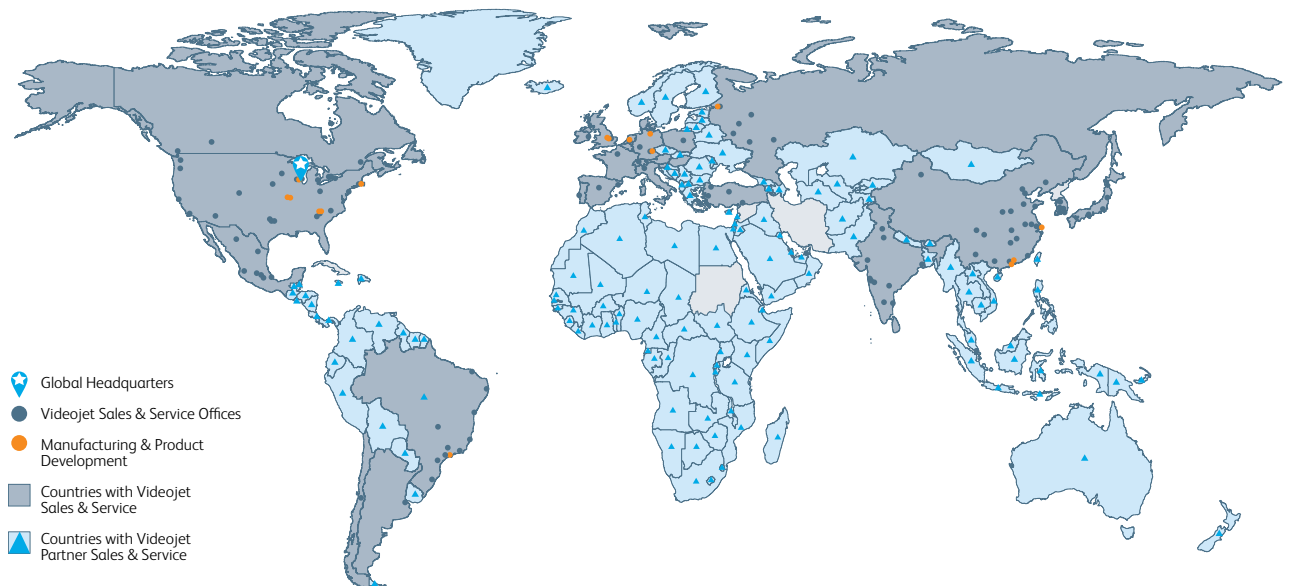
Peace of mind comes as standard

Videojet Technologies is a world-leader in the product identification market, providing in-line printing, coding, and marking products, application specific fluids, and product life cycle services.

Our goal is to partner with our customers in the consumer packaged goods, pharmaceutical, and industrial goods industries to improve their productivity, to protect and grow their brands, and to stay ahead of industry trends and regulations. With our customer application experts and technology leadership in continuous ink jet (CIJ), thermal ink jet (TIJ), laser marking, thermal transfer overprinting (TTO), case coding and labeling, and wide array printing, Videojet has more than 325,000 printers installed worldwide.

Our customers rely on Videojet products to print on over ten billion products daily. Customer sales, application, service, and training support is provided by direct operations with over 3,000 team members in 26 countries worldwide.

In addition, Videojet's distribution network includes more than 400 distributors and OEMs, serving 135 countries.



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