



Knowledge article

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Picking the right laser for coding beverages: CO₂ or Fiber?

Beverage companies are always looking for coding and marking solutions that have a quick return on investment (ROI). Codes on beverage containers are often regarded as necessary evils, but in truth, they are significant components that provide product tracking and safety information. One solution that beverage producers are turning to more often is laser technology.

Multiple factors are considered when determining what type of coding and marking equipment is best suited for a product. There is a balance that must be juggled to ensure that the chosen equipment coordinates with the following requirements:

- Packaging material (paperboard, PET, HDPE, aluminum cans, glass, etc.)
- High production speeds
- Product handling
- Line automation (or lack thereof)
- Line location for coding and marking equipment

Beverage producers are looking for solutions that fit within the above criteria. Further to that is the battle over capital funding. How much can be spent? What is the total cost of investment?

Lasers eliminate the need for buying and warehousing consumables and can smoothly integrate into a high-speed production line with minimal maintenance required, making them increasingly popular for this segment.

So which laser best fits the production requirement?

CO₂ laser technology in beverage

CO₂ lasers are primarily used on PET bottles and paperboard materials. The wavelength is always tailored to meet the application. The wavelength for a laser coding onto a PET bottle at 1,000 bottles per minute is different from that used on a 12-pack of soda in a paperboard carton running at 200 bottles per minute.

There are a variety of other factors that must be tested and reviewed before deciding a CO₂ laser application. How deep is the penetration of the laser onto a PET container? Where on a PET container should the laser code be placed (shoulder, top, etc.)? Does the material allow any contrast after the laser code is complete?

CO₂ laser



CO₂ lasers are primarily used on PET bottles and paperboard materials. A variety of wavelengths and lenses available to ensure the optimal solution for your materials.

Fiber laser



Fiber lasers are the perfect coding solution for high speed beverage can lines and other high throughput applications.

Lasers are available in different wattages. The degree of power is determined by the size of the code, code content, density of the material, and other factors. A pre-test will help determine the best application for the job.

CO₂ lasers do not require complex guarding packages. Manufacturers place a polycarbonate shield around the area where the material is lased to provide protection. The beam emitted from a CO₂ laser is generally absorbed by polycarbonate after contact, which prohibits any type of serious injury.

CO₂ lasers are usually small enough to be positioned in the following areas:

- On high-speed production lines
- Inside blow molders
- Inside labelers
- Inside high-speed cartoners

Some of the above applications require lasers to be installed in tight confines, which often means installing a beam delivery system. This beam delivery can be designed with different lengths to allow the beam to be delivered in hard-to-reach areas. There are generally no speed issues as today's galvos (mirrors) move at high speeds to match the laser delivery.

Fiber laser technology on beverage cans

Fiber laser coders are a relatively new product in the beverage industry. The ability to concentrate a highly intense beam of energy and focus it onto a beverage can is a highly technical and coveted science. Multiple companies offer fiber laser technology, but beverage companies require a solution that includes the following components:

- Fiber laser capable of coding cans at high production speeds
- Fume extraction
- Cooling system
- Customized guarding package
- High-speed cameras, lighting, and sensors to validate code integrity.

Very few companies offer fiber lasers suitable for the ultra-high production speeds required by beverage can coding. These speeds can be up to 2,000 cans per minute (CPM). Beverage codes on cans are generally two lines with approximately 16 to 24 characters per line. They are also typically 2-3 mm in height. A fiber laser has a small window to place its code at these high speeds. The amount of time needed is code specific but is generally in the 25-millisecond range.

Product handling is paramount to successfully coding cans with a fiber laser at these speeds. Cans that are bouncing, banging into each other, or not properly indexed can be coded, but those codes may have defects that make them unreadable. A smooth, consistent flow of cans will help ensure a repeatable and high-quality code.

The capital costs for fiber technology are more significant than CO₂ lasers. The costs vary depending on the wattage, guarding package, and customization required. All fiber lasers require a guarding package that protects the operators so that no appendage can be inserted and to eliminate any possible beam escape. The guarding must be interlocked for safety with weep holes to allow water or line lube to escape, but it is also designed to enable an operator to clean the laser head or adjust the height to accommodate a can height change.

Fiber lasers are available in different watts, similar to CO₂ lasers. The wattage is determined by several factors: line speed, material, code size, etc. Testing is recommended to specify the correct laser.

Apart from occasional filter replacement, there are no consumables required when selecting either laser technology. The installation times vary depending on the application and production line, but it is usually completed in days.

Laser technology, in general, lends itself to software that can drive it from a host network. A touch screen interface is generally made available, but the ability to remotely select a stock keeping unit (SKU) prevents the issue of operator mistakes.

Conclusion

Laser technology is a clean and affordable option in the beverage industry. However, understanding which laser and the components required is vital when trying to match this industry's high speeds and complex lines to the correct laser.

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