



Laser Engraving and Sign Building

Laser engraver sign construction

is a non-contact cutting system that combines electrical impulses with gases to cut away material and create a message or sign, whereas a traditional-type engraver physically cuts and scribes the surface of the media on which the sign builder works. Lasers offer a new technology that refines and improves sign building. They make product faster, with less effort, more precision, lower production costs, and cleaner results.

The laser tube on the engraver system is what does the work. "The laser tube is the key to any laser engraving and cutting system. The laser tube contains not only carbon dioxide gas but also a secret mixture of nitrogen, hydrogen, and other gases. When this

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gas mixture is excited with electricity, there is a complex reaction inside the tube that creates the invisible beam of light that is a CO₂ laser beam," says Mike Dean, director of sales and marketing at Epilog Laser (www.epiloglaser.com). "A CO₂ laser is a gas-filled metal or glass tube with internal mirrors; on one end is a fully reflective mirror, and on the opposite end, you'll find a partially transmissive mirror through which some of the laser energy will be allowed to escape, creating a laser beam."

Depending on the material being cut, different gases are mixed with the CO₂ to aid in the cutting process. "[CO₂ lasers] process materials by vaporizing, melting, burning, or ejecting them with a gas jet. Air, nitrogen, or oxygen gases are commonly used to assist in or enhance laser processing," says Cathy McBeth, marketing specialist at Synrad Systems (www.synrad.com). "When cut-

ting acrylic, for example, a jet of air or nitrogen is often used to cool the sides of the cuts, reducing melt-back and charring as well as ejecting vaporized material away from the work surface. Steel-cutting operations benefit from the use of oxygen, which aids cutting by way of an exothermic reaction."

Gases in the tubes typically have a lifespan of a few years before needing to be replaced. "Generally, the gases in a metal laser tube will last approximately three to five years before you see any need to recharge the gases and can be factory-refilled," says Dean. "In the lower quality glass laser tubes, you'll see around six months of use before it needs to be replaced."

The interaction of gas with electricity isn't a new technology—as it's responsible for powering the light bulb. However the light produced in the laser tube is different. "A light bulb also pro-

duces light by exciting a gas with electricity, but that light is made up of many different wavelengths traveling in all directions," says Dean. "A laser harnesses just one wavelength of light and directs it in a straight line. When the laser beam is directed onto a material, it reacts with that material in a very consistent way that makes the laser useful for a wide variety of non-contact cutting and marking applications."

It's the laser's ability to burn away material that allows for non-contact cutting. "A laser system utilizes the intense energy of a laser beam to partially or completely vaporize the material being processed," says Cherie White, marketing manager of Universal Laser Systems (www.ulsinc.com).

In addition to the laser, the engraving system also has a hardware system, which allows sign builders to use software to guide and run the laser as it cuts digital images fed into the system. Most sign builders say they worked from images created in CorelDRAW®, the most referenced image software. Nonetheless, most laser engraver systems will work with any Windows®-based design software like Photoshop®, Illustrator®, or AutoCAD®.

Laser engraver work begins with an image. Derwin Mann, owner of Mann Signs in Bismarck, North Dakota, explains, "A sign builder digitizes the image of the sign the client wants produced, and from that digital image, he cuts and engraves the sign onto the appropriate materials."

Laser engravers come in different strengths and have limited ranges of use. For example, if a sign builder knows that his company will cut most of his or her engraved work in steel, aluminum, and other metals, he or she may want a laser

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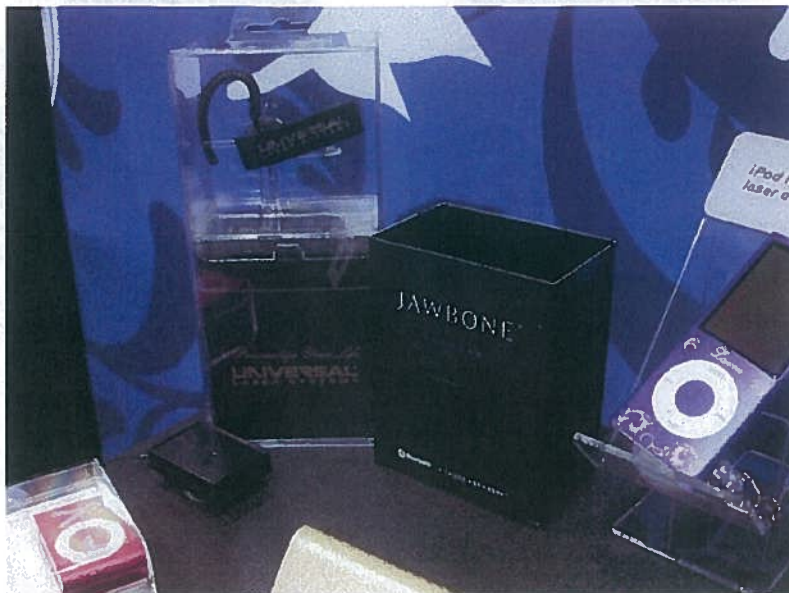
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that produces higher wattage than a laser that cuts into plastic or foams used for monument signs.

The higher the wattage produced by a laser, the quicker it works. Imagine a laser as a router. The higher RPM routers cut smoother and faster. That simile applies to a laser, as well. "A power configuration [wattage] on the laser mainly affects the speed at which projects are completed," says Dean. "A higher wattage machine will produce results identical to its lower-wattage counterparts. However the higher wattage system will complete the job faster. Likewise the lower-wattage unit will cut the same materials as a more powerful machine—it just may take multiple passes."

No matter which lasers are used, they bring new technology to sign shops and improve their performance. "Laser systems have far superior capabilities versus rotary engravers, in comparison. Laser systems can consistently produce (from part to part and system to system) intricate designs on a wider range of materials and hold tighter tolerances," says Elizabeth Goode, director of Global Marketing at Universal Laser Systems.

PHOTOS COURTESY OF ULS, INC.



Inlays are a common way sign builders use laser engravers to manufacture their products. The accuracy and precision of a laser cut allows for more detailed and highly accurate inlays than can be accomplished with any other cutter. With a laser engraver system, sign builders can cut letters, shapes, graphics, and text from a variety of materials.

From these shapes they can then create a contrast of images. "The precision of the laser cut—which is measured at .004-inch—allows sign builders and designers tight tolerances with which to create detailed images," says Dean.

However there are some areas in which laser engravers fall short.

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"Because rotary engravers are cutting or scribing the surface of material rather than burning it, they can engrave directly to a huge range of off-the-shelf materials without the need for special coatings or treatments," says Andrew Oransky, director of Product Management at Roland DGA (www.rolanddga.com), citing a benefit of traditional engravers.

One of the ways in which engraving directly to the material is necessary is with wayfinding Braille signs. Creating a Braille sign requires direct contact with the sign material to cut and connect pieces, and laser engravers cut but don't physically construct or shape an image. The traditional and still viable roller engraving systems strongly compete for business when sign builders have to meet the Americans with Disability Act (ADA) Braille compliance. "There are several specialty applications that rotary engravers are particularly well suited to, which offer engravers the opportunity to generate additional revenue from non-traditional products. The two most popular right now are rhinestone apparel decoration and ADA signage," says Oransky.



All the laser companies interviewed admitted to the great expense of manufacturing Braille signs using laser engravers. The process of creating the signs is built around specialized software their firms developed for the signage.

Despite this setback, sign builders can still produce engraved signs with a laser engraver on almost any material, including wood, paper, plastics, glass, textiles, rubber, and metals.

Guy Barone, president of Xenetech

Laser Systems (www.xenotech.com), details how sign builders could apply laser engraver technology to different materials. Some of his suggestions included using laser engravers on acrylic for logo engraving on interior or exterior signs and plaques. "Markings on laminated plastics, safety signs, nametags, panel faces, message boards, and interior signs are some of the things that can be made with a laser engraver," he says. "You can also use the technology on glass and window inserts for text, logos, and photos. There are also various products that can be laser-engraved from metals and wood."

Although there are many different types of lasers, the CO₂ laser has been the most popular within the sign industry. "It's so versatile," says Dean, describing one of the reasons a CO₂ laser is popular. "It reacts well with a much wider variety of materials than most other laser types, and it also has the advantage of being inexpensive—at least as lasers are concerned."

Laser engravers allow us to cut spending and increase output—which is something we're all looking to do. ■

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