

Laser Technology: What You Really Need to Know

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Laser Technology: What you Really Need to Know As hard it may seem to believe, lasers have been used for engraving purposes for over 20 years now. And in that timeframe, there have been many changes, resulting in a technology that is increasingly more user friendly, less expensive, and more versatile than ever.

The Technology

Lasers, like many of our inventions, first came to existence in laboratories where scientists discovered that, by creating a light source and focusing the energy, one could produce a medium powerful enough to burn through certain materials. Control the burn and you have a powerful tool used for a wide range of industrial purposes including welding, heat treating, cutting, etching, and engraving. The process is not unlike using a magnifying glass in the sun. Through the diligent work of scientists and later engineers, a variety of mediums for making such a light source were discovered, giving us a variety of lasers, each suited for a specific purpose or purposes. For the engraving industry, the most common laser is called a CO₂ (named for the gasses that create the light source.)

The first laser engraving systems made were large, cumbersome, and expensive. They used a high powered laser to burn an image on to a substrate through the use of a stencil. Therefore, the only laserable artwork had to have all lines connected in the stencil. The next generation of laser engraving machines used a scanning method to produce engraved images. Black and white artwork was placed on the table and scanned by a sensor. When the scanner read black, it would turn the laser on. When it read white, it would turn the laser off. This equipment was expensive and additionally required the ongoing replenishment of gasses. Also, because the systems were sold as open units, there were a variety of safety concerns present for owners and operators. The lasers also required specially trained laser technicians to perform all maintenance and repairs.

As the technology grew, lasers became sealed making the replenishment of gasses unnecessary. Many of the manufacturers started making enclosed units which diminished some of the safety issues. They also became increasingly easier to use and maintain, and price tags started to come down, making it more realistic for more shops.

The Engraving Advantage

It didn't take long for engravers to discover that laser engraving had distinct advantages over more conventional methods of engraving. Because the tool is a beam of light, engraving by laser produces a non contact mark which results in less wear and tear on tooling, There is also less chance for product damage and deformation. There also no consumables with today's equipment like there may be with other methods of imprinting.

The resulting mark is permanent, clean and concise. Additionally, lasers are faster than many of the conventional engraving methods, and provide greater versatility in material and product choices.

Enter the computer

As laser technology continued to expand, so did computer technology. It was the greatest thing to happen to laser engraving. Designs could be built on a pc and literally fed to an engraving machine. Initially, all machines used proprietary software, which was oftentimes limiting and difficult to learn. However, it didn't take long and graphics programs were interchangeable, giving the user the freedom of choice. In addition, computers and the accompanying software become increasingly more user friendly and versatile.

Today's equipment has become increasingly easy to install, use, and maintain. The engraving system is connected to a computer via a parallel printer cable. A machine driver, provided with the machine, is installed into the pc. The process is much like adding a printer to a computer. The original equipment manufacturers continually upgrade their drivers to give even users of older equipment the latest in computer technology. Artwork is generated on the pc in a graphics program much like CorelDRAW (other products are used as well) or artwork is scanned in via a scanner, and then cleaned up as necessary. When the artwork is ready, it is sent to the engraving system via a "print" command. Variables such as speed, power, and resolution can be controlled via the pc or the machine itself. The manufacturer can assist you with selecting a computer that is best compatible with your laser engraving system. Keep in mind however, that greater computer capabilities will result in greater engraving capabilities as well.

Safety.

Because a laser is a beam of light and also defined as capable of emitting radiation by the CDRH (Center for Radiological Health), lasers do raise certain safety issues. Both the manufacturer and the user are required by law to

comply with certain regulations. Manufacturers are required to build safe equipment and affix warning labels to the machine. Users need to be aware of the hazards and use the machine accordingly. There are also fire hazards that need to be heeded. It is recommended that you always have a fire extinguisher (recommended for electrical fires) close at hand. Additionally, high voltages of electricity are present in the system's electronics that operators and maintenance persons should be aware of and take the necessary precautions. To ensure clean air for laser users, visitors, and neighbors, a good working exhaust system is also essential to move vaporized materials out of the facility. There are materials that can pose real health risks when inhaled so knowing what you are laser processing is essential as well. Always use caution and follow the original equipment manufacturers recommendations to ensure a safe operating environment.

The Applications

Today's laser engraving equipment remains an exceptionally versatile tool that is used by a range of industries for a variety of purposes. Common applications include the manufacture of plaques and awards, ad specialty items, labels, tags, signage, craft items, stationary and greeting cards, scrapbooking, flexible circuitry, stencils, gaskets, rubber stamps, gift items, woodworking, framing, photography, and point of purchase and memorabilia displays, just to name a few. Additionally, a variety of products can be enhanced or personalized via laser. Popular laser engravable materials include wood, plastic, paper products, acrylic, glass, metals (coated and uncoated), vinyl, marble, corian, and a host of synthetic materials. Popular laser cutting materials include paper products, sign vinyl, acrylic, plastic woods and veneers. New materials, products, and processes are being consistently developed so it pays to stay current with industry trends.

Conclusion

Today's laser engraving equipment is easy to learn, run and maintain. It is also more affordable than in past years and has greater options, speed and versatility. To learn more about today's laser technology, contact the manufacturers of new equipment, attend trade shows, read industry trade publications, and use online venues and searches. You can find a listing of suppliers, trade publications, and upcoming trade shows in our Who's Who section of our website.