

Hot end laser marking

Improved marking system control increases productivity

by David A. Belforte

For glass container manufacturers, the stakes are high with regard to meeting higher quality standards and decreasing losses due to product recalls and disputes. To meet these and other industry demands, glass container makers must identify and trace each product and/or container through the entire processing cycle.



[The laser marking system provides a unique identification of each individual container for complete traceability during the whole product life.](#)

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MSC Company, based near Lyon, France, and its partner, the Saint Gobain Cinématique et Contrôle (SGCC), developed a laser system that engraves a Datamatrix (2D matrix format) code on individual bottles that can be automatically read downstream to track the time/day of

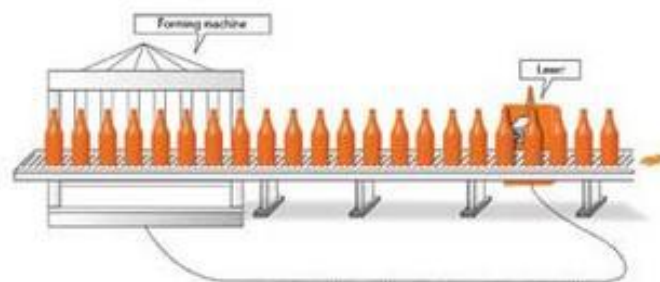
manufacture and to supply information for future traceability. Four of these laser marking lines have been installed in Europe and are running today.

The engraved Datamatrix code, which consists of the company code, glass plant code, line code, time stamping and section, and cavity or mold number, is applied as each bottle, still hot, exits the glass making machine. Most important, each bottle receives its own unique 2D matrix code, which is where MSC ran into a major problem. Its laser marking process couldn't meet the new production line speed of 700 bottles per minute while providing a unique mark for each bottle.

Formed in the early 1960s to perform on-line inspection in hollow glass production, MSC has become the world leader in hollow glass inspection equipment. In 2003 the company became an independent supplier of bottle inspection and marking systems. Currently, the company is a global supplier of this equipment with 80% of the European hollow glass production lines equipped with MSC products. Present on all continents, MSC supplies products to the major North American, South American, African and Asian glass makers who entirely rely on the performance and reliability of MSC inspection equipment.

MSC began using Datamatrix code because of its advantages: high information density, redundant security and resistant encoded marking, marks of high quality without microcracks, improved decoding performance, exclusive readability by professionals and compliance with international standards.

After researching existing suppliers of laser marking units, and learning that these companies could not meet MSC's challenge of uniquely marking 700 bottles per minute, MSC then approached Lanmark Controls Inc., a manufacturer and distributor of marking process control hardware and software based in Boxborough, Massachusetts.



[The Total Tracer, a hot-end laser engraving system, marks a code \(datamatrix or alphanumerical\) on each container. This code can be read by an automatic reader installed in the cold-end or by a handheld decoder allowing complete traceability.](#)

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In 2005, Lanmark developed its LEC-1 control board: this board was different as it featured an Ethernet connection versus a USB. In a typical marking application, one USB board is connected to one PC, meaning each system is standalone and cannot be networked. More importantly, each PC must communicate directly with each laser marker—a costly and time-consuming process. The LEC-1, however, is a networking device, meaning users can access the board from

anywhere on the network—an important consideration if the company has a large number of markers—and these markers can be accessed and controlled independently from one central location without having a PC in the middle of this action. The LEC-1 also allows users to diagnose problems remotely.

The LEC-1 can also accommodate high-speed marking environments, such as the one found in the MSC environment. With the LEC-1, MSC could now mark ten data matrix codes per second, and each one unique. And, because the data matrix image is generated directly on the LEC-1 controller, the company is able to mark its bottles on the fly at these feed rates

As the bottles exit the high-temperature mold glowing red, a video inspection is made of each bottle. A datamatrix code is then generated, which is stamped on the bottom of the bottles while they're still glowing hot. (MSC has a patent that covers laser marking bottles while they are still hot.)

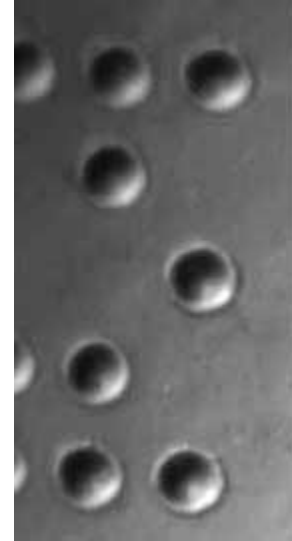
Says John Oskirko, president of Lanmark Controls, “The key technology here is that this board can generate new marking content without a PC—and it can run the jobs in high-speed environments while creating a unique mark for each item. With other technology currently available, you can save a job on the board and play back that job repeatedly, but only with the same marking image. And, you can't interact with the job once it is saved onto the board. With the LEC-1, you can save a setup for a laser mark on the board, and control many aspects of the job by directly communicating with the LEC-1 from a PLC, for example. In the case of the MSC application, the Datamatrix string and the process line speed are communicated to the LEC-1 at the rate of 10 times per second. A Windows-based PC simply could not meet the demand for high marking speeds.

In another application, Lanmark Controls is cooperating with OTB-Solar (Eindhoven, Netherlands) to produce control software for a fully integrated large solar panel fabrication line being built. In this online application, OTB's customer is developing their own proprietary solar cell project which produces four large panels simultaneously. OTB expanded their existing panel line to handle these larger panels on which four galvo controlled laser processes are performed on the substrates: scribing, cutting, and marking for example. Lanmark's WinLase software and the LEC-1 controller will be used to control the galvo motions that perform the laser applications.

Because the large solar panels are processed simultaneously—that is, all boards are scribed, then cut, then marked at very high process speeds—OTB chose the combination of the WinLase Software and the LEC-1 controller in order to better control the processing speed over a short process cycle time (meters/second). Because the LEC-1 is a networked device, multiple LEC-1 cards (up to 200 in a single network environment) can process different scan tasks simultaneously by receiving the tasks from a single PC.

This completely new process design is in the final R&D phase and OTB expects that the first line may be installed in 2010. Although OTB works with other solar cell manufacturers, this specific proprietary multi-process, multi-board application will be only with the one customer.

In applications as diverse as laser marking cell phones, to spooling wire on the fly, pharmaceuticals to medical devices, automobile parts to cereal boxes, the LEC-1 embedded controller is networking laser marking systems in production lines and advancing laser processing technology. Lanmark Controls expects to expand their LEC-1 embedded controller and WinLase software capability into other materials processing applications. The company can be reached at +1 (978) 264-0200 +1 (978) 264-0200 or via its website at www.lanmarkcontrols.com.



[A Datamatrix code offers a number of benefits, including: high information density; redundant, secure, and resistant encoded marking; high-quality marks without microcracks, improved decoding performance; exclusively readable by professionals; and recommended by international standards.](#)

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