



Ruger has developed several fixtures that hold parts exactly in focus for custom laser-etching machines, which are now used to cut nearly all the markings on Ruger firearms parts, including serial numbers.

Great Impressions

Ruger turns to lasers to make its mark

The SR1911, along with all other Ruger semi-automatic handguns, is manufactured at the company's 240,000-square-foot manufacturing facility in Prescott, Arizona. To meet ATF regulations, Ruger has to ensure that the finished products are all properly marked with the firearm's model, caliber, manufacturer, serial number, and other details. For years, these marks have been made by roll-marking (a process in which identifying marks are machine-stamped into the parts to be marked).

But a shift in the materials used to make their handguns made roll-marking more difficult. "Like automobiles and aircraft, firearms have shed weight," says Michael Scoggins, Ruger's chief manufacturing engineer. "And you don't want to sacrifice product strength and integrity along with the weight. In our case, we now use harder metals that allow us to use thinner-walled designs."

ATF specifications require that firearms markings be at least 1/16 inch high, with a minimum of .003 inch penetration. To satisfy the regulations and account for manufacturing tolerances by a safe margin, Ruger targets .008 inch penetration in its pistols.

"Historically, we roll-marked everything, but when we switched to harder metals, we had to push more firmly on the parts to create the mark," Scoggins says. "As you might expect, this had an impact on the durability of the fixtures and roll dies. As a result, we turned to exotic—and more expensive—die materials, but we still got fewer impressions than we had with the original process."

Using special mechanical roll-marking heads for serial numbers presented a unique challenge. "For numbers like 1 and 7, which have room on each side to push the material, the dies worked pretty well," Scoggins says.

"But we were breaking zeroes on a regular basis because there's nowhere to push the material in the center. In addition, we had to polish down the splash-up material from the roll mark.

"The parts, labor, changeovers, and downtime were costing us a lot," Scoggins says.

Clearly, something had to give. Looking for a more efficient and cost-effective way to comply with ATF regulations, Scoggins considered using lasers. After considerable research, he selected a 20-watt (FQ20) ytterbium-doped pulsed-fiber laser-marking system from Ohio-based Telesis Technologies, Inc. These lasers deliver a high-power laser beam directly to the marking head via a flexible metal-sheathed optical fiber cable. It's a rugged mechanical design able to operate in an industrial environment where shock, vibration, cutting oils, and dust are a concern.

"When we first began talking with Telesis, their fiber laser-marking system had been on the market for only about a year, but what most attracted me to the 'boys in Ohio' was their willingness to listen to my requirements and work together as a team to develop a solution without a bunch of sales pressure," says Scoggins. "The lasers we use today—we have several here at Prescott and are adding more

to our Newport, New Hampshire, facility—are not standard products. This was really a cooperative effort between Telesis and Ruger."

Scoggins needed a laser-marking system that could work around the clock with high uptime and minimal maintenance. "We're not making key rings here," he says. "We needed something that was going to run 24/7 in an industrial-shop environment."

Scoggins estimates that the first laser paid for itself in less than a year. "We saved tens of thousands of dollars a year by moving from roll-marking to laser-marking and thousands more in labor because we don't need a specialist to replace aging and broken dies, and changeovers were reduced to seconds to key up a new program."

After the success of the first laser system, Scoggins returned to Telesis Technologies, saying he needed a smaller and more powerful system to fit on the shop floor—preferably a mobile laser-marking system with a drawer-type enclosure that could be used to mark a significant number of small gun parts. This eventually led to Telesis Technologies' ProStation integrated laser-marking system, which is housed in a mobile enclosure and comes with a higher-power (30-watt) ytterbium-doped pulsed-

fiber laser. The mobile system helped Ruger increase production, a substantial benefit during a period of high consumer demand.

"We developed a number of fixtures that held different parts exactly in focus for the laser, which accelerated our loading, mark, unload and changeover times because we didn't need to adjust the marking system at all," says Scoggins. "Just load, click, and you're done."

Based on Scoggins' and other customers' feedback, Telesis has recently added a small-machine camera-based system that visually checks to make sure a serial number or other mark isn't already present. If not, the ProStation system contacts the company's product-inventory database and retrieves the next serial number for marking.

Before selecting Telesis, Scoggins explored a less expensive laser-marking system, but the results were unacceptable. "I went back to Telesis, and we worked together and came up with a solution. The extra cost was worth it because having Telesis on our side was priceless."

Moving from roll-marking to laser-marking actually did more than just save Ruger thousands of dollars in annual maintenance and labor costs; it helped create new revenue streams as well. The Prescott facility now sells custom marking for special product-line runs and for offerings such as the National Rifle Association's commemorative guns.

"We paint red and white dots for safety indicators. One gun was giving us a problem getting paint to stick to it, so we used the laser to roughen the surface. Problem fixed. We've used the lasers in R&D also, when designing new ammunition magazine geometries and latch locations, burning through .03 inch of 55 Rockwell C scale material. We've even explored welding with the laser, though that's in the early stages," Scoggins says.

Ruger's Prescott facility now only uses roll-marking on limited processes; almost everything has been converted to laser-marking.

"One of Telesis' core values is customer intimacy," says Merrill Apter, vice president of sales at Telesis Technologies, Inc. "Another core value is a mission-specific focus on marking and engraving solutions. Telesis is unique in that it not only offers mechanical pin stamp and scribe systems, but gas, solid-state, and fiber-laser solutions for a variety of high-use applications that demand high uptime, low maintenance, and ease of use. From 355-nanometer to 10.6-micron lasers, all Telesis equipment is manufactured in the U.S. and supported globally through sales, service, and application offices in China, the United Kingdom, Germany, and the Netherlands."

To see how well Ruger and Telesis work together, stop by the Ruger booth. Booth #11840. ■