



Making the case

by Jimmy Myers, senior editor

When it comes to arc welding versus laser welding, Nd:YAG and fiber laser systems offer a leg up with precision welding solutions.

advantage with these processes is that welders can adjust their instruments to work with a range of materials, from delicate to sturdy. However, arc welding comes with a significant amount of heat, which metallurgical professionals know can affect the material around the weld.

LASER ADVANTAGE

One of the main reasons welders are jumping to laser welding today is that it produces only a fraction of the heat generated in TIG and MIG welding. Instead of working with an arc, laser welding utilizes a tightly focused beam of light. The focus is so tight that it can be as little as 0.0002 in. in diameter. The heat is so minimal that the welded part can be handled immediately after the welding process is complete.

Reduced heat is only one facet of the laser welding advantage. Weld strength also is a consideration. Laser welding offers a depth-to-width ratio that can't be matched in traditional welding processes, and that equates to higher strength and a better outcome.

Another huge perk to working with laser welders is that they offer minimal deformity and shrinkage, and there is no physical contact between the laser head and the material.

There is also the precision work aspect to consider – the laser beam is tightly controlled, which permits micro welding on miniature components.

LASER APPLICATIONS

Given laser welding's unique properties, it can be used for production of medical devices, jewelry and precision parts and joining

machined components such as solenoids where minimal heat is important.

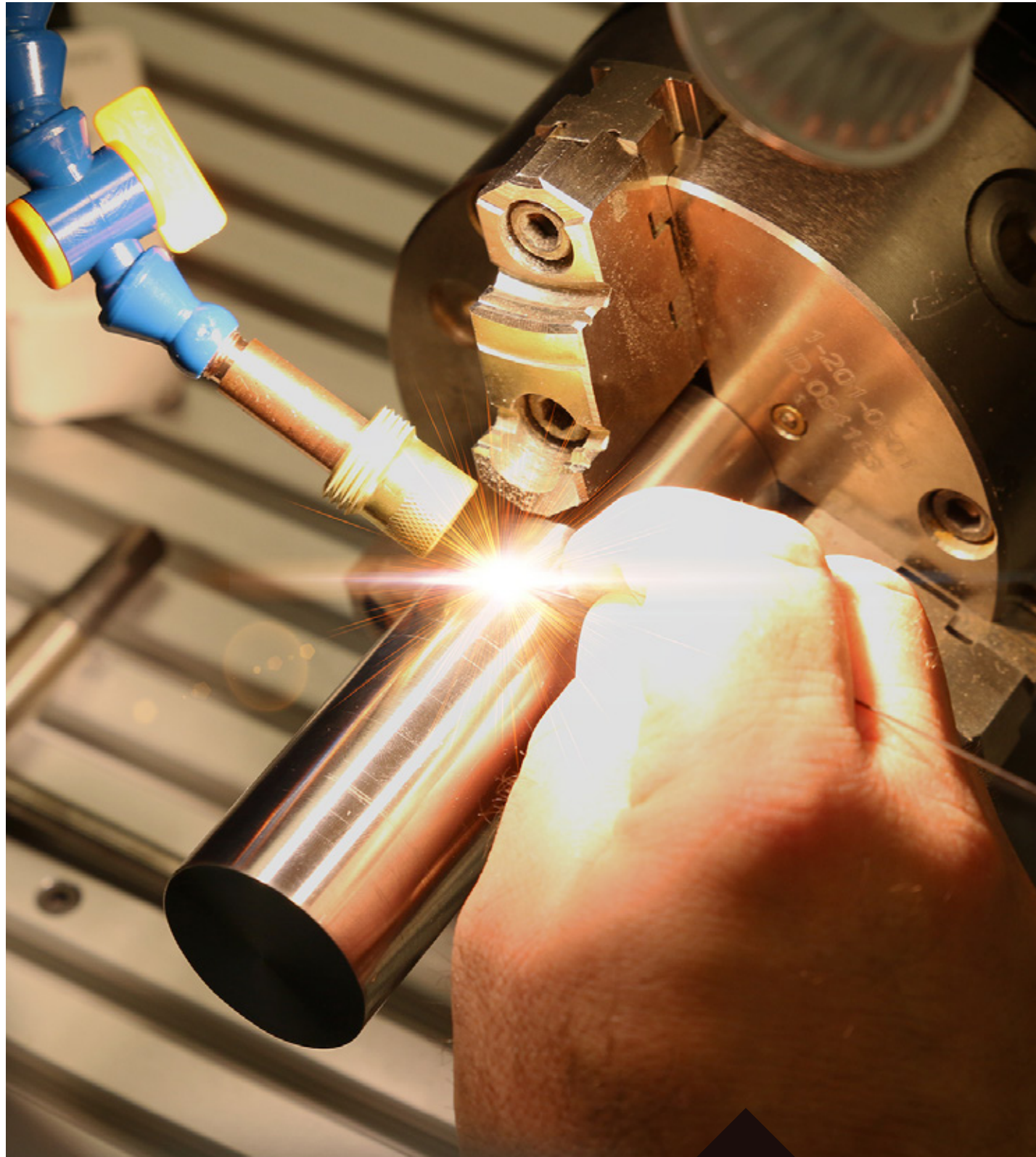
Laser welding is also a go-to process for repairing molds. Mold surfaces can easily be repaired or restored ▶

LaserStar's laser welding solution is perfect for working around precise contours, especially in injection mold repair. Check out the video below to learn more.

For skilled welders, MIG and TIG welding has remained the preferred choice for welding small components. Unfortunately, not all welders have the skill and dexterity to lay down a proper weld on small components. Furthermore, heating effects occur with MIG and TIG welding that can compromise the integrity of the metal workpiece. Laser welding has become an alternative to TIG and MIG processes for a number of reasons, including the cost of the new technology isn't as prohibitive as it once was.

MIG and TIG welding utilize a shielding gas that creates an inert atmosphere around the weld. The





The amount of heat generated by laser welding is so low, it doesn't warp base materials.

with laser welding, and it's proving to be a cost-saver as well as a time-saver compared to building new molds from scratch. In some cases, mold replacement would be the only alternative if not for laser welding. Laser welding is actually among the fastest growing technologies for mold repair today because it can be used to fill porosity, run a bead of alloy along a complex edge, refill damaged surfaces and correct manufacturing defects.

Pete Mourourzis, president of Dayton, Ohio-based Wicked Welding, says that his two LaserStar welding systems have been an indispensable tool for mold repair in his shop. He said, "no matter how good I got with micro-TIG welding, it would never beat laser welding."

THE ND:YAG SERIES

In the 1990s, LaserStar Technologies Corp., which was founded in 1957, became the only U.S. manufacturer of Nd:YAG laser welding systems. Since then, it has grown into a global supplier of laser sources and systems for deep engraving, cutting, marking,

CNC laser machining centers, motion systems and, of course, welding.

LaserStar has a full line of manual Nd:YAG laser welding workstations used in industrial applications. These include the 1900 industrial welding system, the 7700 dual-component system with a universal jig workstation for portability and larger parts, and the 7800 open welding workstation.

These laser welding systems can successfully use filler wire up to 0.020 in. in diameter. They are ideal for a variety of common welding applications, including tooling and die repair, industrial assembly, plastic injection mold and pressure-sensitive hermetic laser sealing. It also fits the bill for many applications specific to automotive, aerospace, aviation, computer and consumer product industries.

When using the Nd:YAG welders, operators can hold the part in their hands while looking through a stereomicroscope pointed at the welding zone. Utilizing an internal crosshair, the part can be precisely aligned with the laser head before the weld begins. ▶



With wires from 0.005 in. to 0.045 in., LaserStar's FiberStar line offers flexibility in welding small parts.

The laser welders are available in a number of power levels, from 80 W to 200 W, and can work with 300 and some 400 series stainless steel, mild steel, nickel, nickel alloys, titanium, aluminum and copper alloys. They can also work with precious metals like gold, silver and platinum. Overall, the process is well-suited for a wide range of applications.

"Laser welding systems are becoming the welding tool of choice, replacing TIG, brazing or torch welding in many industries," says James Gervais, LaserStar's president and chief operating officer.

THE FIBER SERIES

LaserStar has also brought a new fiber laser welding series into the mix, which it calls FiberStar. This line includes the 7600 welding workstation, the 8600 welding workstation, the 8700-2 dual-component welding workstation with a universal jig for portability and larger parts, and the 8800 open welding workstation.

Aside from the fiber laser, the line has many similarities to the Nd:YAG series

in form and function. However, the fiber laser series offers laser resonator technology, which brings peak power, enhanced electrical efficiency, more up time (less down time), optimal performance and throughput, and an air-cooled design that saves space on the shop floor.

The fiber laser series also comes with solid-state diodes, which means power is supplied instantaneously with no warm-up time required. The design of the FiberStar series includes a permanently sealed laser source, which means no grit or grime can come into contact with sensitive laser parts. Furthermore, the system is turnkey, which means there is no laser adjustment required and no consumable parts to be concerned about.

The fiber laser series works with the same metals as the Nd:YAG series, but comes in multiple power levels, including 150 W, 300 W and 450 W. These welding systems can successfully use filler wire up to 0.050 in. in diameter. Operating modes include pulse or continuous with pulse lengths of 0.2 ms to 50 ms. ▶



Utilizing crosshairs in the stereomicroscope, operators can zero in on the work area, making precise welds on small components.

“Laser welding systems are becoming the welding tool of choice, replacing TIG, brazing or torch welding in many industries.”

James Gervais, president and chief operating officer, LaserStar Technologies Corp.

“Our fiber laser welding products offer very high pulse-to-pulse stability,” says Sam Bhambhani, director of sales at LaserStar, “which coupled with power monitoring feedback loop provides long uninterrupted and maintenance-free operation.”

LaserStar markets the fiber laser series to medical, aerospace, electronics, automotive and micro components industries for its ability to seam weld, spot weld, micro weld and mold repair weld as well as for its battery welding abilities.

Overall, LaserStar services many industries, including industrial markets, aerospace, automotive and firearm industries. The company’s products are continuing to evolve into the next generation, says Gervais, adding that the company will be celebrating 60 years in business in 2017. “We will continue to grow our product line as well as improving our current systems.” ■

LASERSTAR TECHNOLOGIES CORP.