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Advancements in Laser Welding Technology

Broadening our Horizons

We are proud to announce the purchase of a brand new Nd:YAG Pulsed Fiber Optic Laser Welding Machine. This new capital purchase is a major step forward for our company, steering us in the right direction to become a prominent figure in Laser Welding services provided worldwide. We have adopted a much wider range of capabilities with this new laser machine and have honed our focus on quality and outstanding turnaround times.

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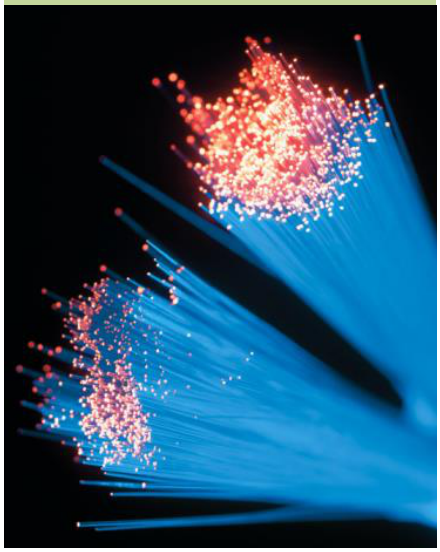

Fiber Optic Delivery

As opposed to older hard-optic Laser Welding systems, Nd:YAG Fiber Optic Delivery System Laser Beam Welders differ quite a bit. This state of the art technology is proven in industry to deliver a much more consistent fusion weld for many applications. The ability to modulate the Laser Beam provides a much tighter control on all welding services provided.

With this new Fiber Laser Beam Welder at our fingertips, we are most certainly capable of delivering a host of desirable welding services. We are able to keep up with the rising market demand, and provide customers with the newest and most innovative technology available to meet their needs.

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Laser Welding Tips

Our new fiber optic Laser is specifically designed for high speed seam welding applications offering high peak power and pulse stability to meet virtually any production welding application.

Penetration-mode welds have a weld penetration that is equal to, or slightly deeper than the weld width. When using penetration-mode laser welding the heat input is reduced due to the lower melt volume, thus creating deep penetration low heat input welding from even low average power lasers.

Each laser can be configured with up to four Time Share and four Energy Share outputs to match any application requirement; utilize one laser to support up to four workstations processing different parts with different weld schedules.

What is Nd:YAG?

Nd:YAG Pulsed Lasers create discrete pulses of controllable energy, peak power and temporal profile or shape to create a weld. It is the control of these pulses that make the pulsed Nd:YAG laser so versatile. Even a lower average power pulsed Nd:YAG laser can produce large spot welds or deep spot and seam welds as the interaction with the material is defined by the pulse parameters.

A pulsed Nd:YAG laser can produce energies from a few tens of millijoules per pulse, however the average power of the laser that produces these pulses can be on the order of 100W. The peak power of a pulsed Nd:YAG laser is usually about 2kW minimum to as high as 10kW.

In general, pulsed Nd:YAG lasers are used for spot welding applications, in the seam welding of temperature-sensitive components or where aluminum and copper alloys are to be joined. Their higher energy per pulse can create a large melt volume from a single pulse and spot welding penetration is function of pulse energy not mean power.

The peak power of a pulsed laser will overcome the reflectivity and heat conductivity of aluminum, copper, and other similar alloys. They can weld up to 3mm penetration. Peak power of around 1kW is needed for welding ferrous alloys and high nickel alloys. For aluminum alloys peak powers of about 3kW are needed and 5kW for copper alloys.

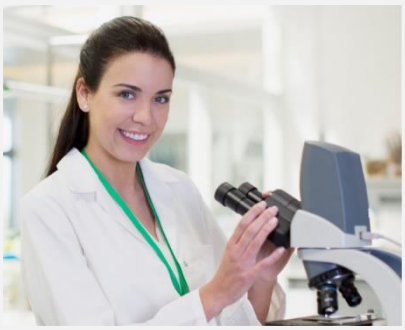
The temporal profile of the pulse can be "shaped" to optimize the weld quality and deal with dissimilar metals. Adjusting the peak power throughout the pulse will control cooling rates to reduce cracking, eliminate porosity, and improve weld esthetics.

Clean Weld Environment

A surge in medical components that require precision Laser Beam welding is on the rise and we took this as an opportunity to purchase new capital and catch as much business as possible in the medical industry. This being said, the new laser welding machine has been assembled in its own “clean” type room to accommodate the needs of the medical industry. This room is fitted with state of the art fume extraction as well as a temperature regulated laser system to provide cleanliness of welds and air quality, and repeatability of process in this new sector of our laser welding department. This dedicated room makes assembly and welding much more simplistic, with dedicated tooling cabinets, as well as a microscope next to the machine for quick reference and checking of weld quality.

Dedicated Argon Lines for Shielding Gas

Another perk to having a separate room for this Laser Welding Machine is dedicated Argon lines which used for shielding gas during the welding process. The lines are ran straight to the Machine, facilitating a more consistent and uninterrupted flow of shielding gas. We strive to keep not only our Laser Room clean, but also the internal quality of the weld spotless as well!



What is shielding gas?

Shielding gases are inert or semi-inert gases that are commonly used in Laser welding processes. Their purpose is to protect the weld area from oxygen, and water vapor during welding. Depending on the materials being welded, these atmospheric gases can reduce the quality of the weld or make the welding more difficult.

Argon is the gas of choice for keeping each and every weld that comes through our shop clean. Gases heavier than air (e.g. argon) blanket the weld and require lower flow rates than gases lighter than air (e.g. helium).

In Laser welding, the shielding gas has an additional role, preventing formation of a cloud of plasma above the weld, absorbing significant fraction of the laser energy. This is important for Nd:YAG lasers. Argon plays this role best due to its high ionization potential; the gas can absorb high amount of energy before becoming ionized.

Materials Processed

Here is a list of typical materials that can be welded on our new machine

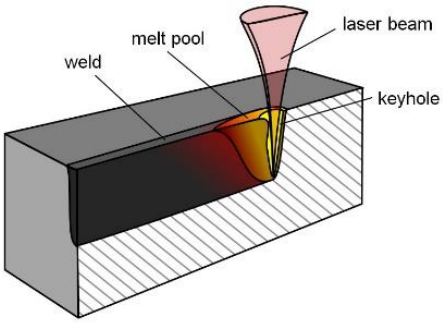
Aluminum
Brass
Carbon steel
Cast iron
Coated steels
Copper
Galvanized steel
Hastelloy X
Inconel
Molybdenum
Monel
Nickel
Stainless steel
Tantalum
Titanium
Tungsten
Waspaloy
Zirconium

Did you know the penetration range for our Laser Welding Machine is between .003" - .060" ?

What is a keyhole weld?

Laser Beam Welding fuses metal with a technique called keyhole welding.

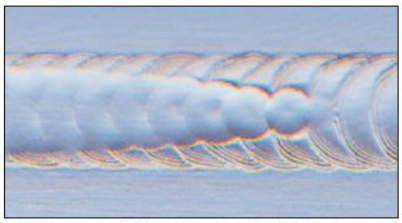
The definition of a keyhole weld is: a technique of welding in which a concentrated heat source penetrates completely through a work-piece forming a hole at the leading edge of the molten weld metal. As the heat source progresses, the molten metal fills in behind the hole to form the weld bead.

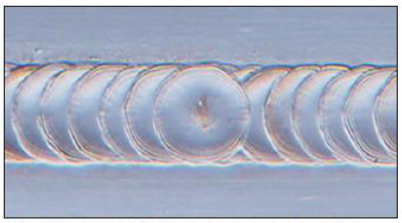


Weld Bead Examination

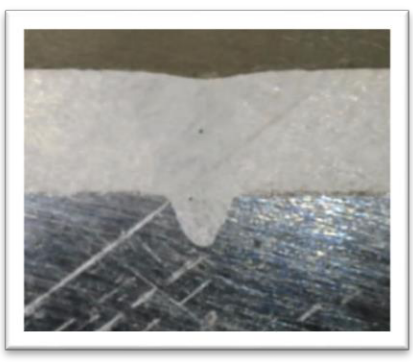
With advanced methods of keyhole joining, and beam power tapering, Laser Beam Fusion welding can take place on a host of different materials to provide a seamless, no filler material required, crack-free weld that is held with utmost integrity.

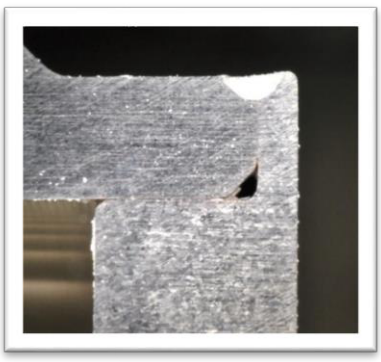
Seam Weld power ramping tapers power for optimal overlap and crack-free hermetic welds.


With ramp-up/down power control function.


Without ramp-up/down power control function.

Examples of cross sectional views of Laser Beam Welds with different joint configurations.





Why Choose Us?

We are a customer driven organization that addresses the elements of customer value. We understand that the voice of our customer is critical in a competitive environment.

Our foundation, culture, values, vision and mission is to provide the highest Quality product to our customer. Our Quality professionals have extensive range of experience, education and training. They are supported by a group of highly competent computer, financial, administrative and welding engineers.

The meticulous attention to detail demanded by our customers, is evident in all of our work. our policy of continuous improvement has led the company to becoming ISO 9001:2008, AS9100 and NADCAP accredited. Throughout its history we have found that careful processing, attention-to-detail, utilization of modern well-maintained equipment and adherence to an effective production control system reduces cost and improves quality.

Applications

We have been surveyed and granted approvals and certifications by over 200 private companies and government agencies. These customers represent leading companies in such diversified industries as Aerospace, Aviation, Electronics, Energy, Industrial, Medical, Military, Nuclear, Research, Science and Space.

Here is a partial list of our customers:

Boeing Lockheed Parker Hannifin Rolls Royce Raytheon General Electric Bombardier Gulfstream Jet Propulsion Lab Allied Signal General Dynamics Aerojet U.S. Navy Honeywell

We are considered a world-class metal joining company, tackling jobs most organizations consider impossible.