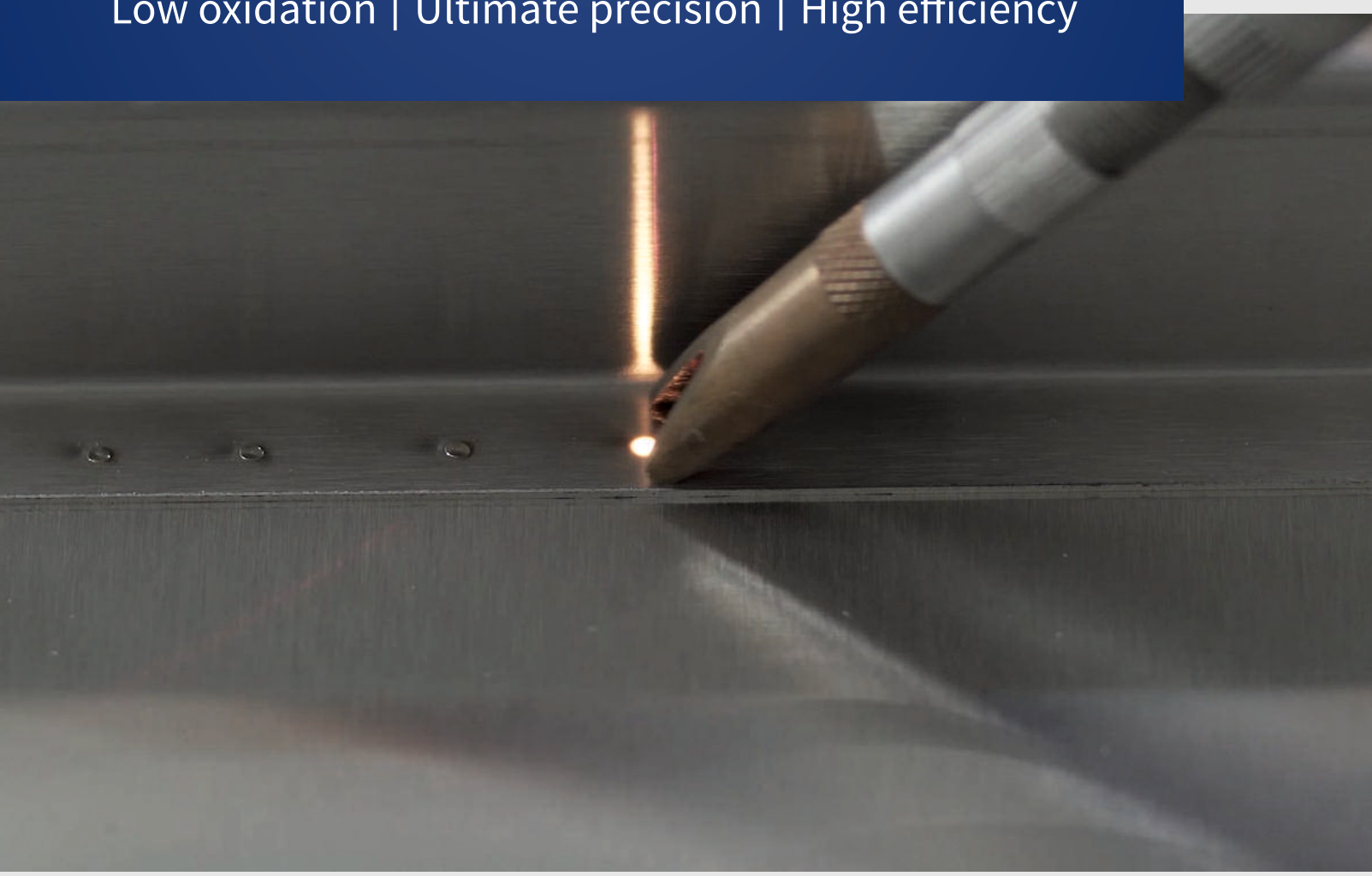
DIODELA

Photonics Solutions for Industry

LASER WELDING SYSTEMS

Low oxidation | Ultimate precision | High efficiency



www.diodela.lt

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ABOUT LASER WELDING

How It Works

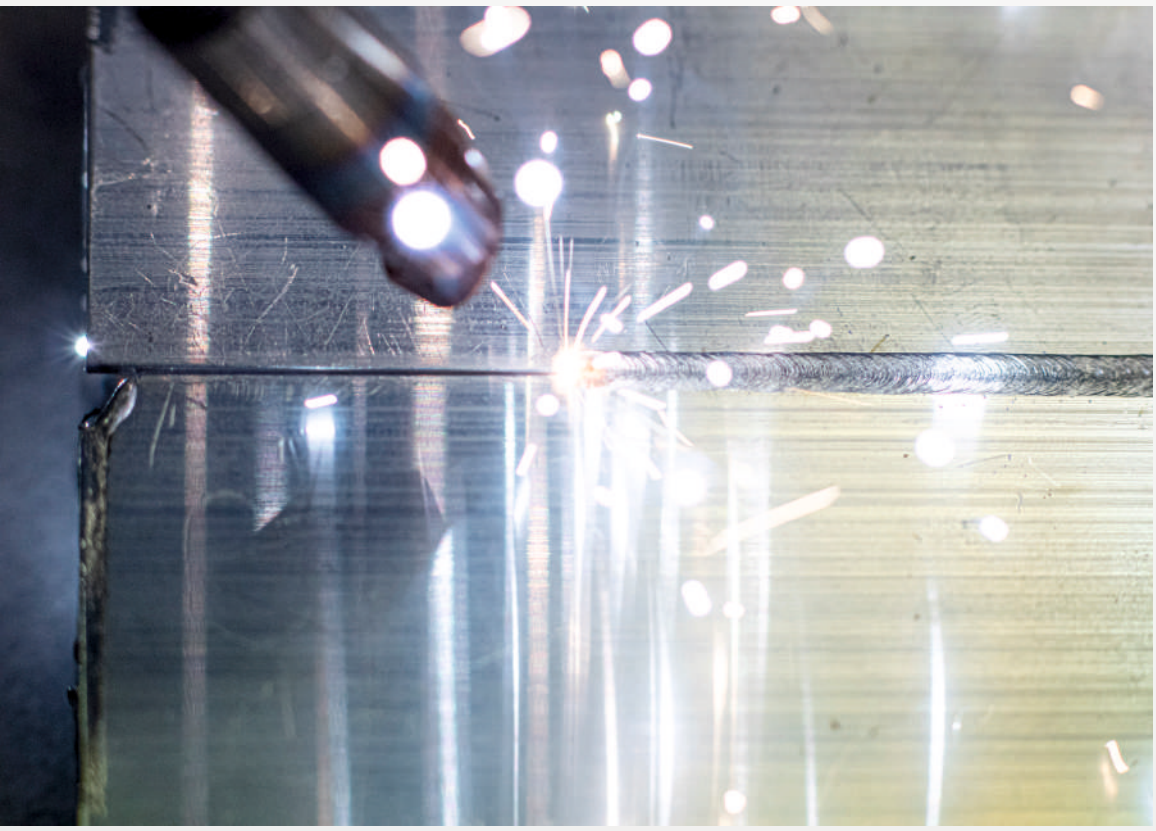
Laser Beam welding is an industrial laser process used to join various materials together by creating a strong weld between them. This process creates strong and permanent joints between two types of materials. The laser focuses a beam of high-intensity light in the desired area. The goal of this process is to physically melt the two materials together to form a bond between them.

The laser welding method provides ultimately precise heat input to the desired area with narrow full penetration welds which make an aesthetic final result with close to zero welding oxidation. This method helps to avoid any thermal and physical distortion to the end product without additional processing when joining thin large sheets. Laser welding is the finest method for minimizing loss of base material properties, such as hardness and strength.

Although laser welding is mostly used for joining metals, it can also process other types of materials such as plastics and silicone. Low waste and simple maintenance make this technology user and environmentally friendly.

Welding Speed

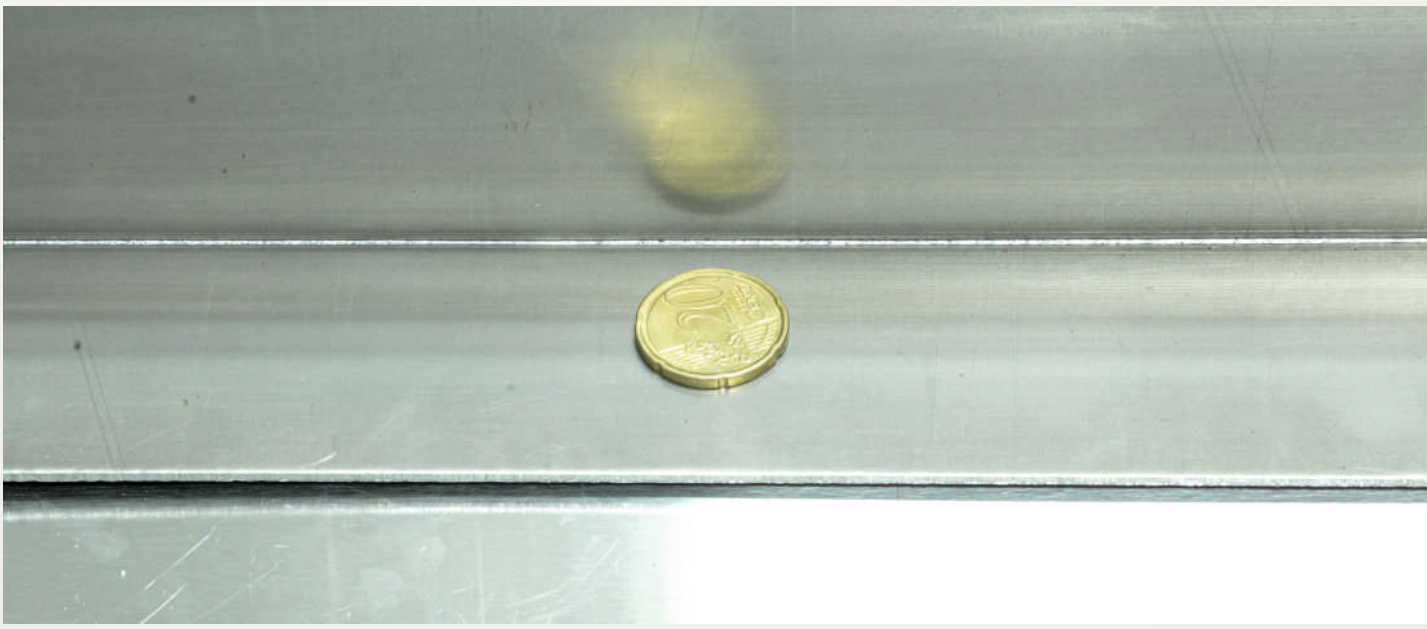
This process can be used in both hand-held precise and large-scale automated workshops, allowing welding speed of 1-5m/min. Laser welding is very effective in processes which require pace, because it is >5 times faster than MIG and >10 times faster than TIG.



Scan this QR and see laser welding in action

ADVANTAGES OF LASER WELDING

- **Close to zero physical distortion** – when thin large sheets are joined, laser welding avoids thermal and physical distortion for the end product without additional processing;
- **Low welding oxidation** – laser welding method provides ultimately precise heat input to desired area with narrow full penetration weld which makes an aesthetic final result;
- **Ultimate precision** – user can easily achieve a high level of accuracy even without a welder background due to non-existent reflection of laser light, easy manipulation and precise heat input to the desired area;
- **Reliable** – high-quality Lithuanian industrial design built for durability and reliability;
- **Creating complicated joints** – our laser technology allows creating complicated joints easily which is not possible with other traditional welding techniques;
- **Low level of heat** – the process uses a low heat application that minimizes any damage which could otherwise have been caused to the components or materials;
- **High-strength welds -** laser welding creates monolithic joints without filler metal;
- **Excellent mechanical properties** – laser welding does not affect the material or its structural properties;
- **High speed -** laser welding speed is up to 5 m/min. It is >5 times faster than MIG and >10 times faster than TIG;
- **Long and wide sheets welding** - allows welding of sheets with different steel grades and dimensions;
- **Cost-efficient welding solution -** low energy consumption. 40% less electricity consumed with Diodela's laser welding compared to the MIG machine, for example, when 3 mm stainless steel is welded;
- **Sustainable** – our systems are energy and environment-friendly;
- **Smart and easy use**: integrated touch screen allows saving your parameters for the next welding to achieve consistent results and save up a lot of preparation time.



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DIODELA LASER WELDING SYSTEMS

Diodela laser welding systems are based on quasi continuous wave diode and fiber laser technology developed in Center for Physical Sciences and Technology (FTMC) for Diodela.
Laser welding systems **prices start from 12 000 Eur.**
Expected laser welding systems **lifetime > 90 000 hours.**
All Diodela systems are provided with **24 months warranty and user trainings.**

How to Choose a Suitable System?

The easiest way is to send us a two piece sample (~ 10x10cm preferably). We will be able to specify welding speed and effect of desired system on specific material. After testing, we will advise the most efficient system for your specific needs.

All Systems Are Equipped With Accessories Necessary to Operate

With standard (8m) fiber cable, power cable (2m long – can be modified) accessory kit including (2pcs eye protection, 2pcs respirators, IR detector, lens, welding kit and etc.).

Important Notes

I. Power is not everything. Contact Diodela team and discuss how laser welding can serve to your applications in most efficient way;
II. All systems have 2-year warranty and possibility to extend warranty up to 3 years;
III. All systems include professional class 4 laser safety and exploitation training;
IV. This process can be used in both hand held precise and large-scale FWS type laser welding system automated workshops, allowing welding speed of 1-5m/min.

SPECIFICATIONS

Model	Dio-500	FWS-1000	FWS-1500	FWS-2000
Laser source	Diode laser	Fiber laser	Fiber laser	Fiber laser
Output power	500W	1000W	1500W	2000W
Power adjustment range	10-100%			
Wavelength	1080 nm			
Output operation	Continuous / Modulated			
Modulation frequency	Up to 50 kHz			
Power stability	<3%			
Adjustable wobble (weld width)	0.1 – 5 mm			
Central focus distance	Standard 120 mm (150 mm optional)			
Cooling	Integrated water cooling			
Warm up time	1 min			
Working humidity	<70% (at 40 degree Celsius)			
Working temperature	0 – 40 degree Celsius			
Laser welding gun weight	< 1 kg			
Optical cable length	Standard 8 m (up to 15 m optional)			
Overall system dimensions	650 x 550 x 500 mm	1200 x 600 x 1300 mm		
System weight	90 kg	120 kg	120 kg	130 kg
Power supply	Single-phase 220 VAC			
Power consumption	<1.5 kW	<5 kW	<7 kW	<9 kW
Weld thickness (single pass)	Up to 1mm	Up to 3 mm	Up to 4 mm	Up to 5mm

Table of specifications for Diodela laser welding systems

Optional

- Laser diode sources;
- Fume extraction unit;
- Automatization solutions;
- Expanded warranty;
- Lens options.

APPLICATION FIELDS

Laser welding process is being used in many industries, including:

Automotive – welding of numerous parts such as air bag initiators, batteries and fuel injectors for high strength welds;

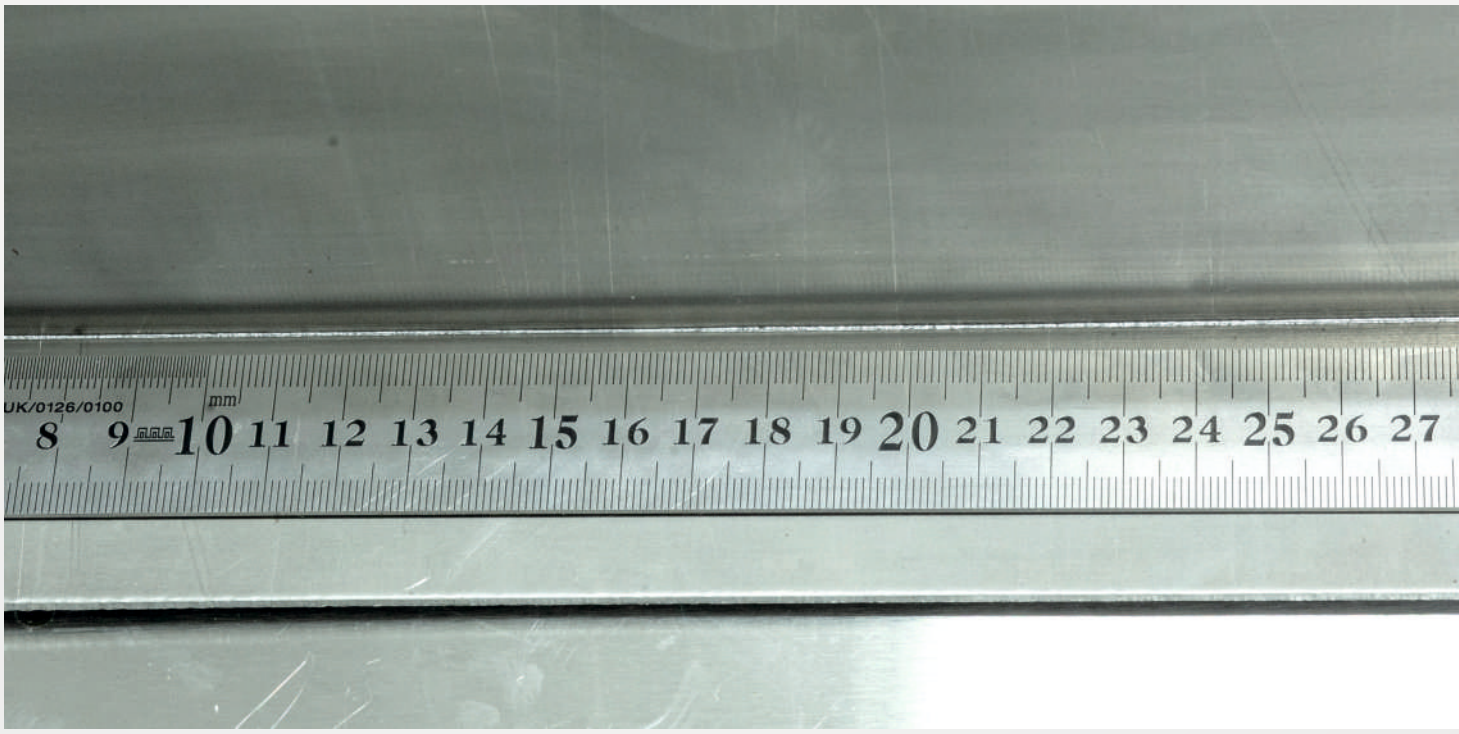
Aerospace – welding of different varieties of metals is critically important in this industry while laser welding guarantees precision, no damage for the materials due to precise heat input to desired area and high strength welds;

Electronics – welding is used in the production of various electronic components of equipment such as LEDs, mobile phones, TVs, etc. to create precise and complicated joints;

Medical – high integrity, hermetic seals and welds of many precise pieces of innovative medical equipment for ultimate precision;

Semiconductors – small welds are created in micro sized semiconductor parts because of laser welding precision and possibility to create complicated joints;

Furniture Manufacturing – precise aluminium and steel components welding. Laser can save parameters for next welding to achieve consistent results and save up a lot of preparation time.



MATERIALS

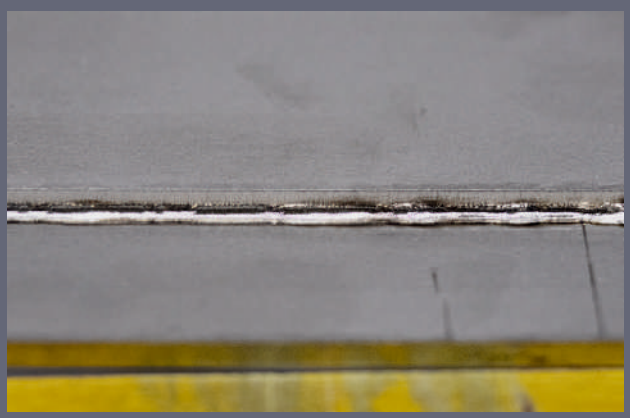
A whole range of materials can be worked with in this process:

- Various plastics, including transparent plastics;
- Silicones;
- Metals (stainless-steel, copper, gold, silver and aluminium).

Note:
When the distance between the materials to be welded is up to 100 um, then the additional wire/filler is not needed, the welding seam is monolithic. An additional wire is used when the distance is more than 100 um between the materials to be welded.

WELDING OF LARGE
AND THIN STEEL PLATES

WELDING OF ROUND
ALUMINIUM PIECE



WELDING OF STEEL
WITHOUT FILLER METAL

FIBER LASER
WELD CUT ON ALUMINIUM

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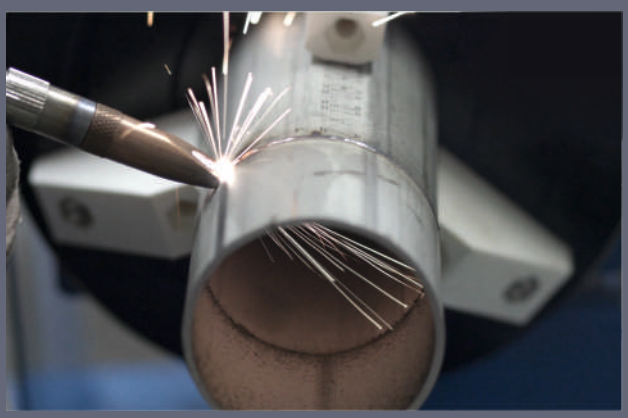
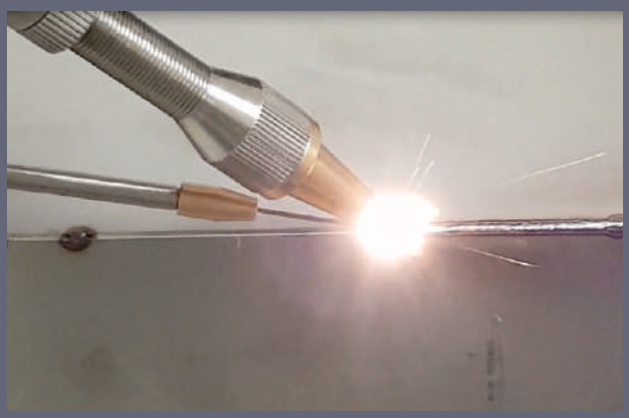
RESULTS OF DIODELA LASER WELDER

CLOSE TO ZERO PHYSICAL DISTORTION

ULTIMATE PRECISION AND
HIGH STRENGTH WELDS



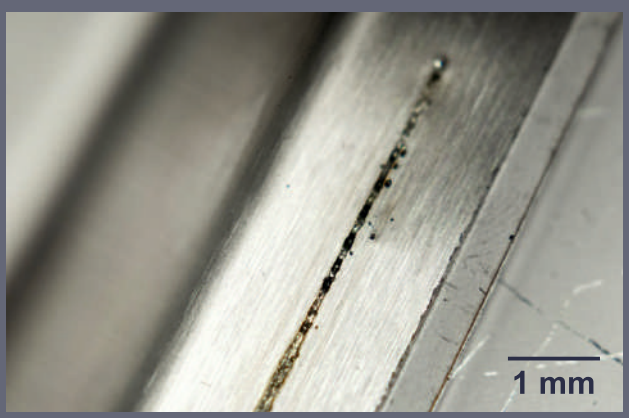
CREATING COMPLICATED JOINTS

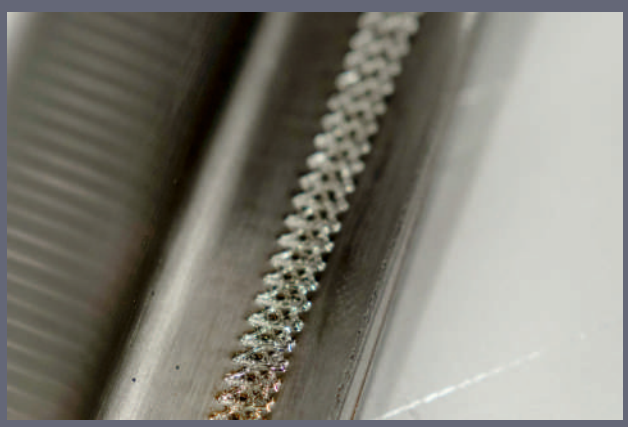


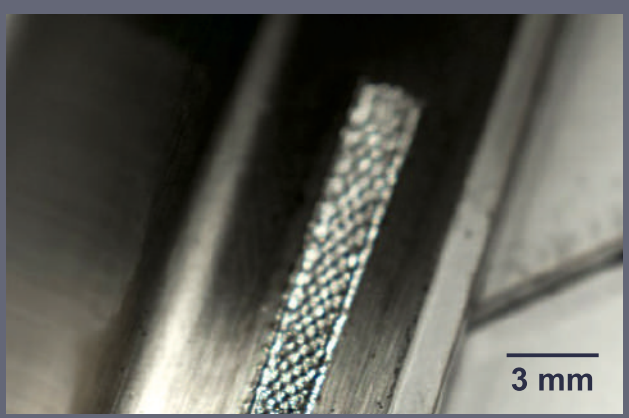
WELDING WITH FILLER METAL

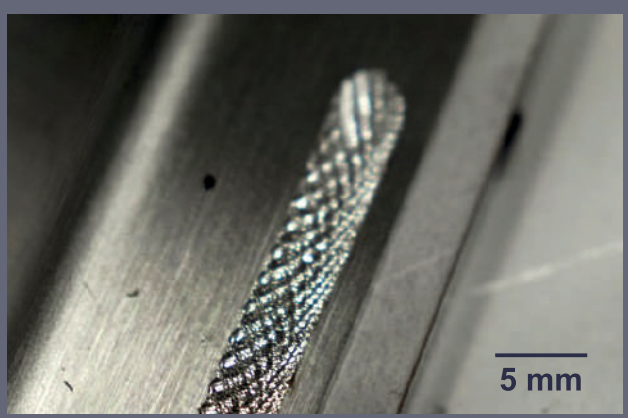
AESTHETIC RESULTS
WITHOUT ADDITIONAL PROCESSING

WELDING WITHOUT FILLER METAL
FOR THIN MATERIALS









DIFFERENT SIZES AND STYLES OF WELDS FOR INDIVIDUAL USER NEEDS

STRENGTH TEST

X-RAY OF OUR LASER WELD

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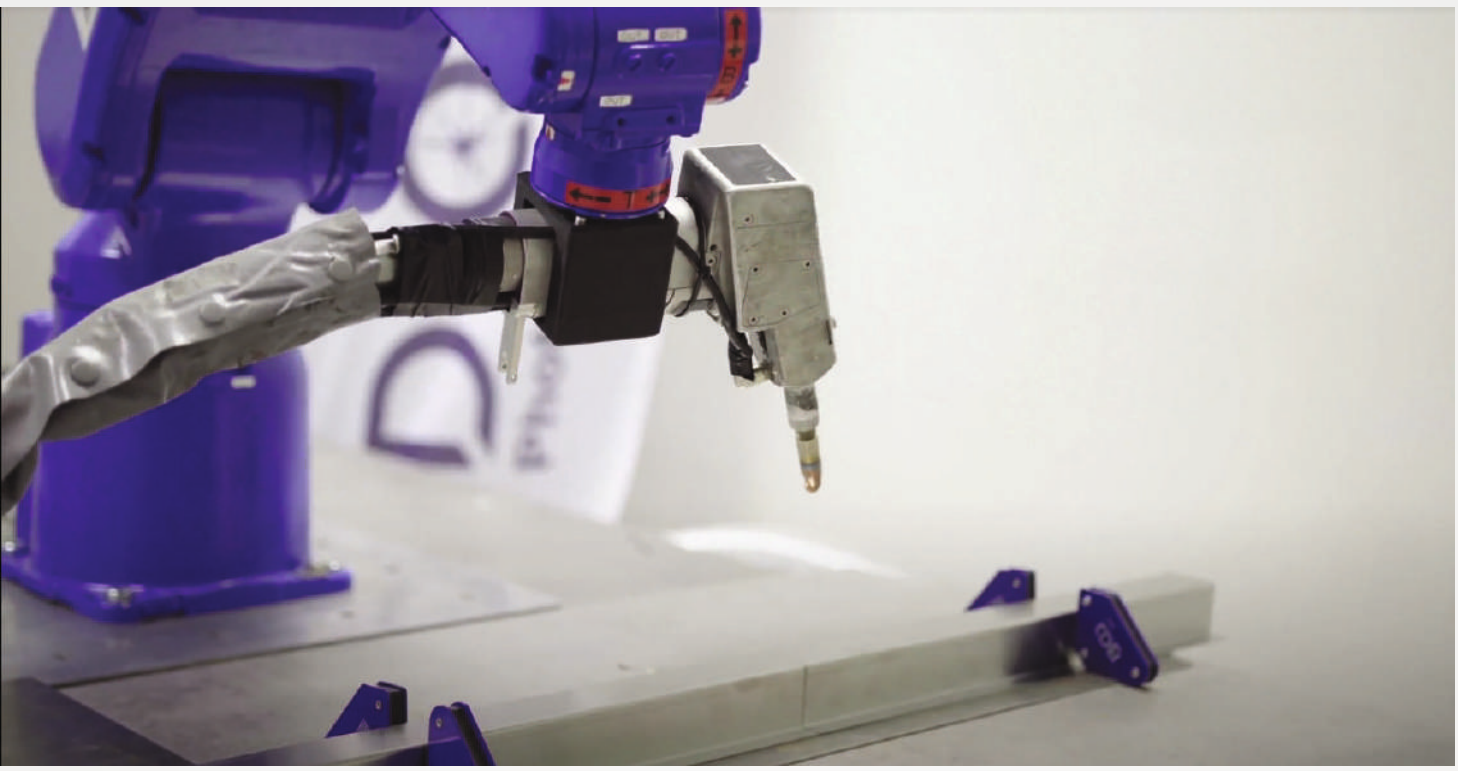
HAND-USE, AUTOMATION AND CUSTOM SOLUTIONS



Hand-use
Diodela's laser welding systems can be used both for hand-held and robotic applications. A lightweight laser gun makes it comfortable and easy to manage for the user. Additionally, the red laser pointer points to the welding spot, making the welding process highly precise.

Maintaining welding quality is much easier with laser welding as the user is able to save the parameters for different materials and does not need previous welding experience. Laser welding systems preparation takes up to 1 minute.

Welding Automation
Laser welding systems can be integrated with all types of robotic arms or CNC.

Custom Solutions
In partnership with the Center for Physical Sciences and Technology of Lithuania, we offer companies various custom solutions using laser technologies.

Do you have any questions?
Scan this QR code and read our FAQ.

SUPPORT, TRAININGS AND MAINTENANCE

Support
Professional customer support is our priority, thus Diodela's team is doing our best to ensure smooth communication and high-quality service. Our experienced engineers are quick in responding to any questions regarding systems use, maintenance and etc.
As a producer of laser systems, our company is able to quickly perform any repair. Our broad knowledge in the laser field allows us to be flexible and do custom modifications for various clients' needs.

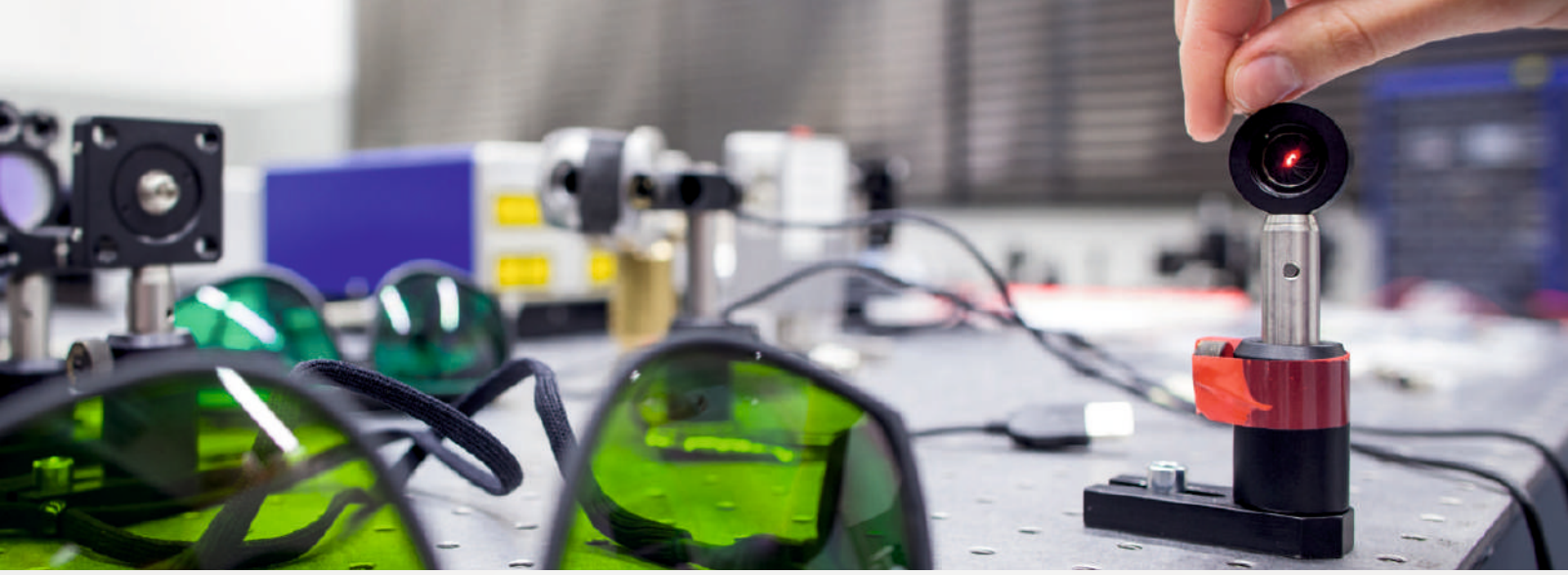
Trainings
Diodela's laser systems are built for smart and easy use, thus trainings take only 1-2 days. Depending on preference, trainings can be organized at client's company premises or during the online call.

During the trainings the user receives safety and maintenance information and trainings for practical skills. After the trainings user will be able to ensure a safe work environment, safely operate the laser system, perform all the necessary maintenance for the laser system and get high-quality welding results.

Maintenance
Diodela laser systems require only minimum maintenance. Technical maintenance of the laser welding system includes:

- The system consumes electricity and inert gas (15-20 l/min).
- The cooling system requires distilled water (recommended to be changed every 6 months).
- Lens cleaning once a week. The cleaning principle is simple and similar to cleaning glasses.
- Lens replacement when they wear out. On average, the lens last 1-2 months but it depends on correct maintenance and workload.
- Replacement of nozzles when they wear out.

With the correct maintenance, Diodela's laser welding system is expected to operate for around 10 years (90 000 hours).



USER SAFETY

Diodela's FWS laser welding machines are classified as a high-power laser system of the 4th category. The system can radiate up to 8kW of momentary power in the IR field (808-1064nm) wavelength range. Laser radiation is not in the range of light visible to the human eye, it can damage the retina irreversibly, thus, safety glasses must be worn during the entire laser system operation period.

All personnel working near the laser welding area must wear laser safety eyewear and protective clothing. Safety glasses must be selected according to the length of the laser wave by Diodela. Depending on the material to be welded, it is recommended to wear respirators or use dust suction and filtering systems.

User manual with detailed instructions is provided during laser system user training. Diodela's laser systems are CE certified.

CE

ABOUT DIODELA

We Develop Technologies

Diodela is a Photonics solutions provider for Industry. Diodela was originally founded as a spin-off of the Center for Physical Sciences and Technology (FTMC). Using FTMC developed and exclusively licensed laser technology our company produces Industrial laser systems for laser welding, cleaning, and other photonics-based material processing. Due to close collaboration with laser science centers and vast experience in photonics, the Diodela team can build innovative and precise laser systems that meet all Industrial needs.

Diodela company is located in Lithuania, Vilnius. The city has a long history in photonics where many well-known photonics companies were established.

We Offer Solutions

At Diodela we use laser technology to create a better experience of welding and material surface cleaning with unlimited precision, high efficiency, and no thermal distortion. Our laser systems are made by professional scientists and engineers using the best theoretical and practical experience. We closely cooperate with Industrial companies to understand their needs and offer a solution that improves their technological processes. We maintain full control of production processes, ensure high quality, competitive prices, fast production times, and professional customer support.

We Encourage Innovation

At Diodela our laser systems are built to increase our customers' productivity and earnings, at the same time being user and environment–friendly. Our mission is to create an industrial breakthrough by supporting innovative companies with excellent quality and client-orientated laser solutions.
We encourage industrial companies to innovate and be many steps ahead in their industries. Diodela will make this journey smooth, cost and time effective.

Our Partners:

CENTER FOR PHYSICAL SCIENCES AND TECHNOLOGY

SCIENCE AND TECHNOLOGY PARK

LITEK


DIODELA
Lazerinis suvirinimas
Lazerinis suvirinimas naudojamas įvairių medžiagų sujungimui sukuriant stiprią suvirinimo siūlę tarp jų.

DIODELA

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LASER WELDING SYSTEMS

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