



Laser Plastic Welding



Leister Technologies AG

Experienced engineers and technical specialists at Leister Technologies AG develop products and systems for plastic welding and process heat applications. With our technologies – hot air, contact heat, extrusion, laser, and infrared – and our passion for innovative solutions, we have a significant influence on our market segment and set standards worldwide.

Our employees take pride in manufacturing high quality products.

Close cooperation with our global clientele, distributors and suppliers is essential to our mutual success.

Local experts provide sales and service support to our customers in over 100 countries. Eight country subsidiaries and 130 sales and service points guarantee our worldwide presence and customer proximity.



“Our laser specialists will advise you competently, to help you find an individual, economical welding process for your application. Laser welding systems are capital goods for which Leister offers you comprehensive sales and service worldwide.”

Carsten Wenzlau
Head of Business Line Laser Plastic Welding



World Leader in Plastic Processing

Leister Technologies AG provides a wide-array of technologies to process plastic within a variety of applications. Our Industrial Heating and Laser Systems business lines offer application-specific products and accessories to heat, join, weld, shrink and form various plastics. We know how.

Industrial Heating and Laser Systems

Leister offers three technologies for industry: Hot air, infrared and laser. We thus cover a large part of the applications of industrial process heat and plastic bonding.

Through its worldwide network, Leister Technologies AG offers a comprehensive range of services for industrial customers – from application testing to product support.

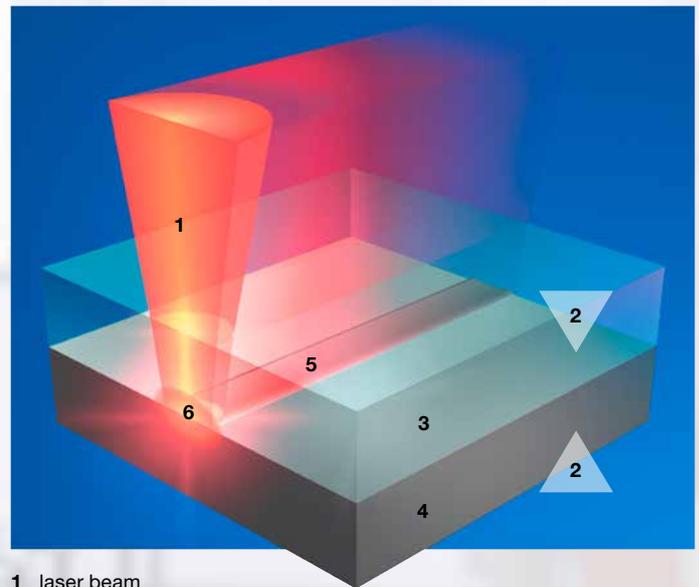
Plastic Welding Products

The Leister product range for plastic welding includes hot air handpieces, extruders and welding machines including extensive accessories for trade and industry. In addition to the Leister brand, Leister Technologies AG also sells products under the Weldy brand name, which are also available as private labels with Weldy components.





Laser Plastic Welding



- 1 laser beam
- 2 joining pressure
- 3 transparent joining partner
- 4 absorbing joining partner
- 5 weld seam
- 6 melting zone

The laser welding principle

In laser welding of thermoplastics, a joining partner that is transparent to the laser radiation is joined to an absorbent joining partner.

The laser beam penetrates the transparent plastic, in technical terms joining partner, and hits the absorbing plastic. There, the energy of the radiation is converted into heat and the plastic melts. On contact with the transparent plastic, the latter also melts due to thermal conduction and bonds with the absorbing plastic. As soon as both plastics have cooled down, a weld is formed.

Laser Plastic Welding (LPW) has established itself worldwide through outstanding performance and application-specific solutions. Innovative markets such as the automotive industry and medical technology are increasingly using laser welding of plastics. The advantages of laser welding are convincing:

- contactless energy input
- minimal thermal and mechanical component stress
- simple joint geometry
- contamination-free
- optically perfect weld seam
- high precision and strength

Comprehensive know-how in Laser Plastic Welding



As one of the pioneers in laser welding of plastics, Leister delivered and integrated the first turnkey system at the turn of the millennium. Since this time, Leister has delivered several hundred systems in use in various industries all over the world. Our goal is to develop specific solutions together with our customers. Our many years of expertise in development, application and sales enable us to provide individual and competent advice for specific applications in laser welding of plastics.

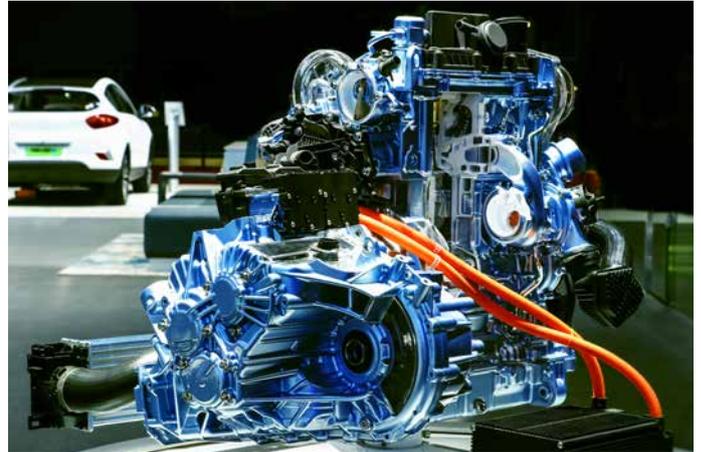


Versatile use

Applications in laser welding of plastics are versatile and can be found in various industries.

Whether small, narrow weld seams or large-area welds – weld seams produced with the laser are visually appealing and are often integrated into the design of a component.

The process has become particularly established for components that required reproducible weld seam properties, such as a hermetic seal for fluidic components.



Mobility

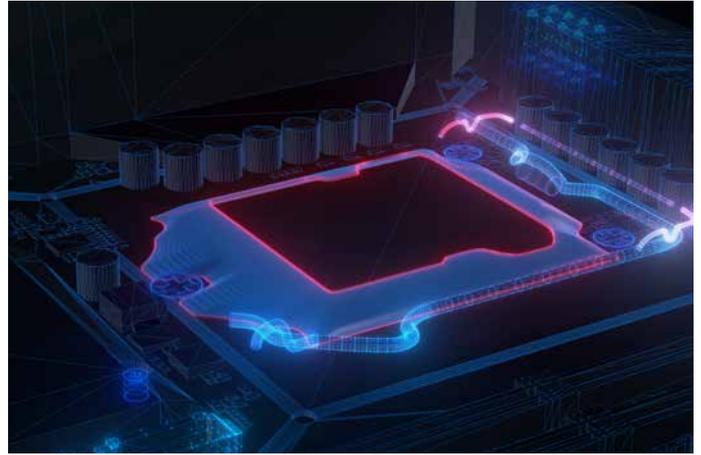
Mobility is the headline of individual freedom of movement. Whether by automobile, plane, train or bicycle. Laser welding of plastics is used everywhere.





Medicine

Laser welding of plastics is the preferred method in medical technology for applications with high safety and hygiene requirements. This is because laser welding produces contamination-free and reliable joints.

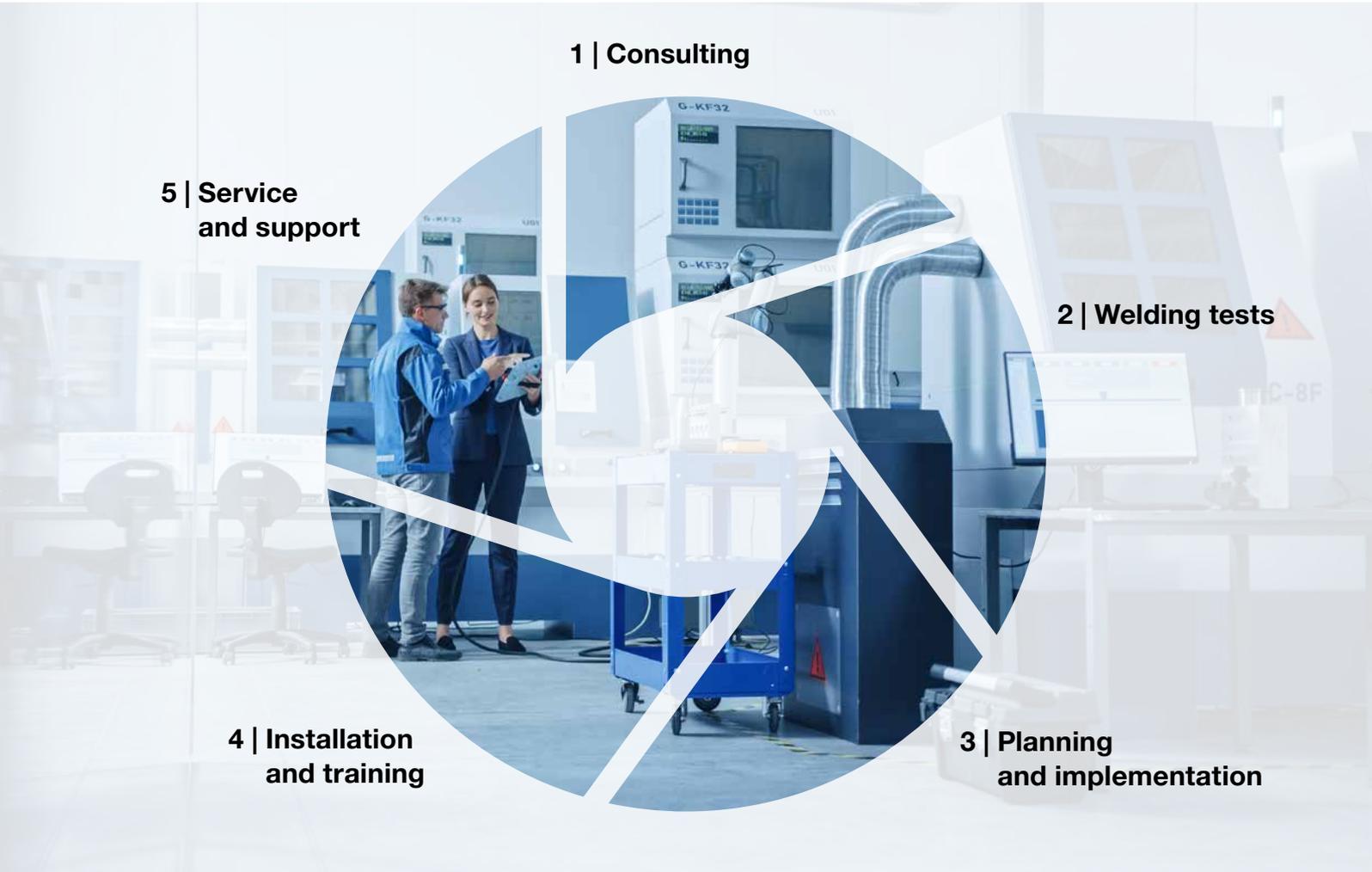


Electronics

Many electronic components are protected from environmental influences by a plastic housing. Sealing with laser beams has established itself in various applications.



Customized solutions



Leister provides its customers with comprehensive and competent support in evaluating the optimum welding process for specific applications. Proposals for material selection, support in component design through to the selection of the welding process

are the first steps, which are checked by welding tests in one of our application centers. Only then is the implementation discussed. Of course, we also accompany our customers during installation and after delivery through one of our service centers.



Suitable material

The right choice of material is also crucial for the success of laser welding of plastics. In numerous tests with different materials, we have developed a welding matrix and published it on the Leister homepage: **Weldable materials with laser**.

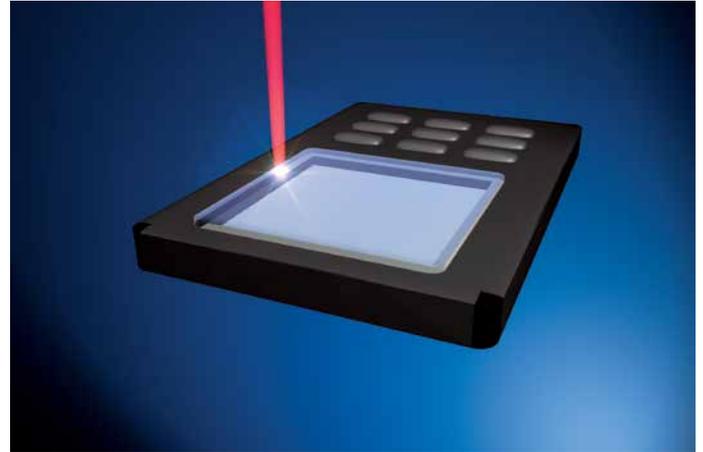


Functional design

The design of the welding zone is subject to general and process-related guidelines for laser welding of plastics. Depending on the application, these can be requested from Leister.

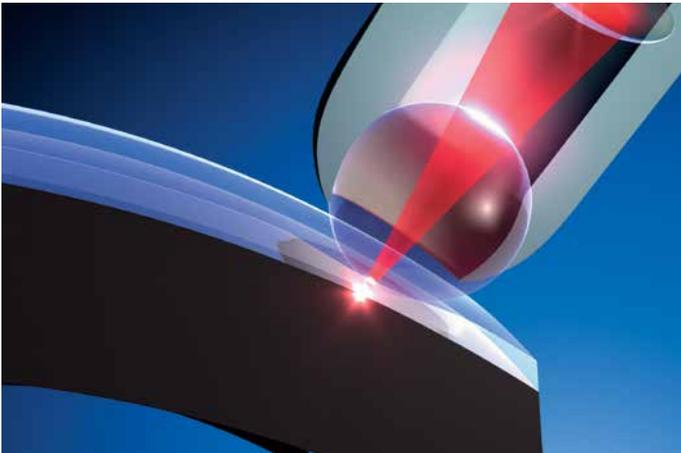
The different laser welding processes

The variety of welding processes results in individual, material and application-specific solutions. Depending on the process, additional options for process and quality control are available.



Contour welding

- Point-shaped laser beam
- High flexibility
- Any 2-D-ironing lines
- Ideal for frequent component changes



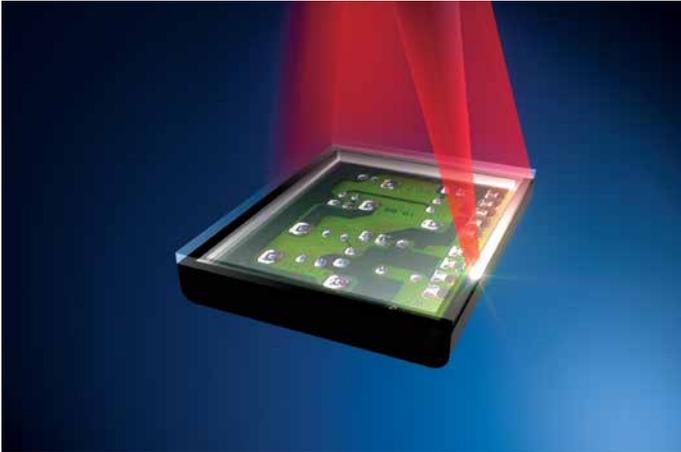
Globo welding

- Any joining geometries in two or three dimensions
- Weld without a clamping device
- Optimum synchronization of contact pressure and energy input
- Suitable for robotics



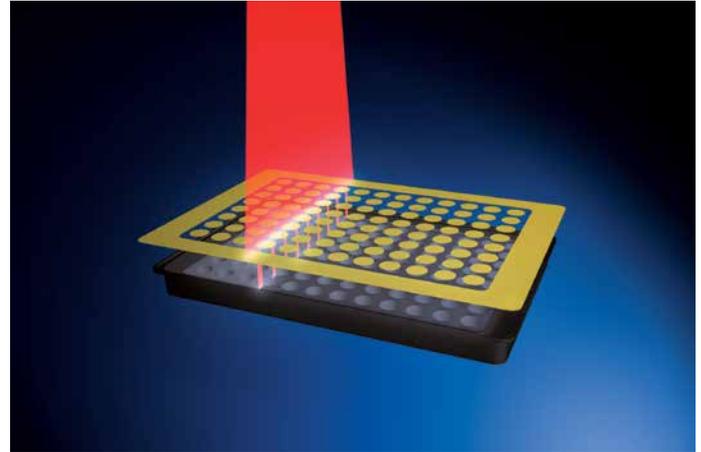
Simultaneous welding

- Short process time
- No relative movement
- Gap bridging possible
- Suitable for mass production



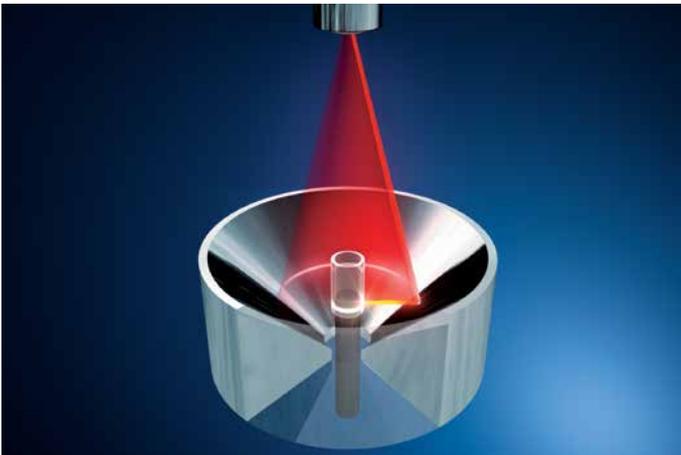
Quasi-simultaneous welding

- Point-shaped laser beam
- Lots of flexibility
- Bridges gaps
- Suitable for small batches and mass production



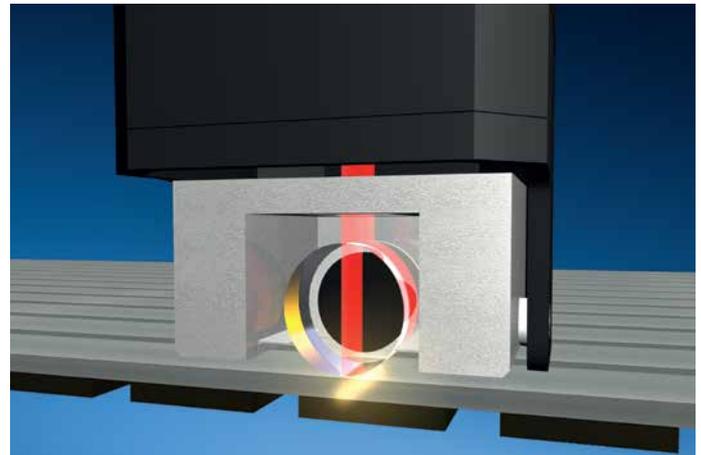
Mask welding

- Linear laser beam
- Any joining geometry in one plane
- Fast and flexible
- Suitable for micro and macro applications



Radial welding

- Suitable for a wide range of diameters
- No rotation
- High throughput
- No clamping device required



Roller welding

- Linear joining geometry in two dimensions
- Welding without clamping device
- Optimum synchronisation of contact pressure and energy input
- Suitable for robot use

Standalone systems

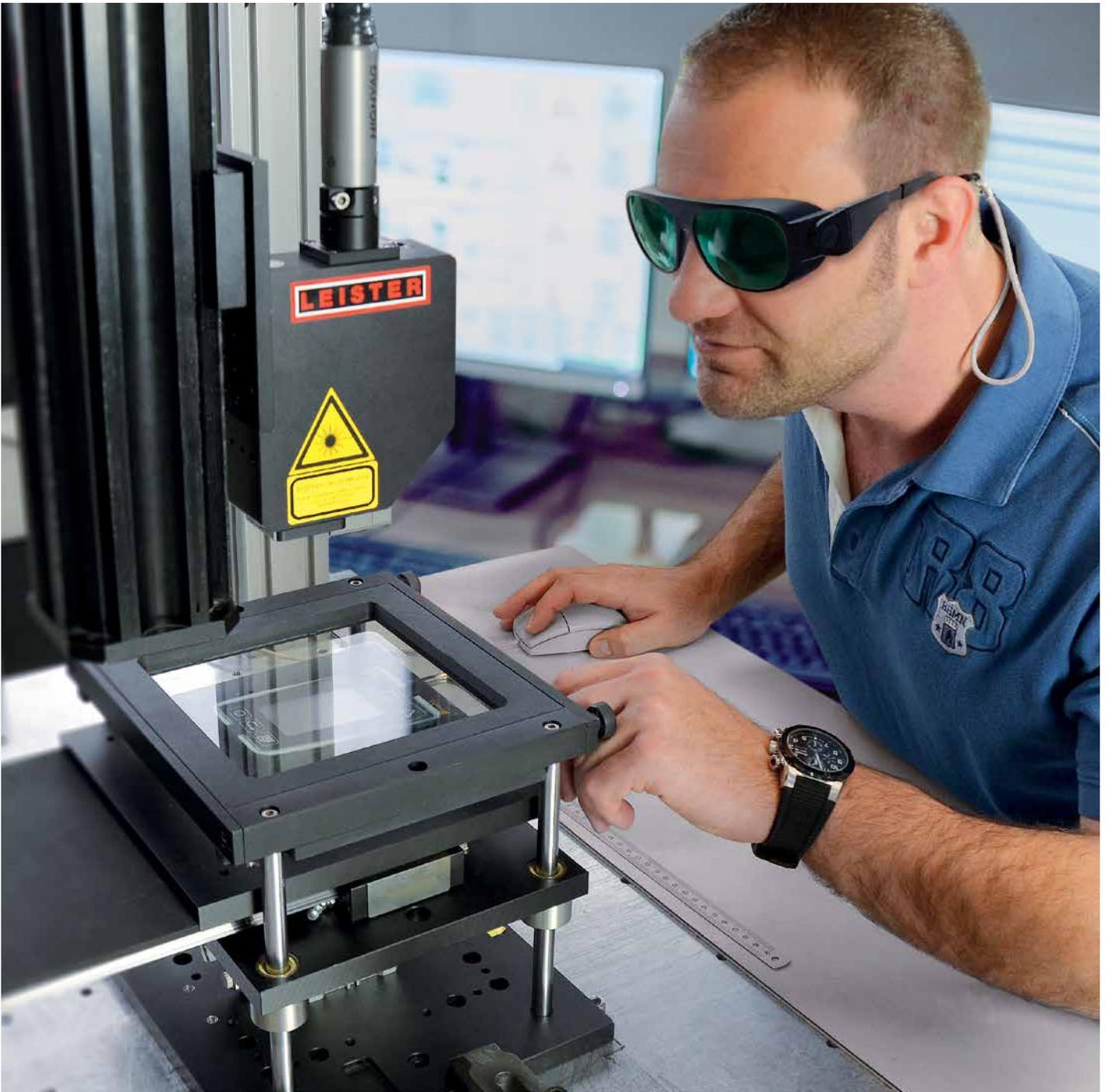
Leister standalone systems handle the entire laser welding process. Movement, laser and clamping device are accessible and individually storable via input masks. This means that different components can be welded with one system.





Integrated systems

The Basic systems from Leister are prepared for integration into production lines or turnkey systems. Their modularity allows integration into different production systems.



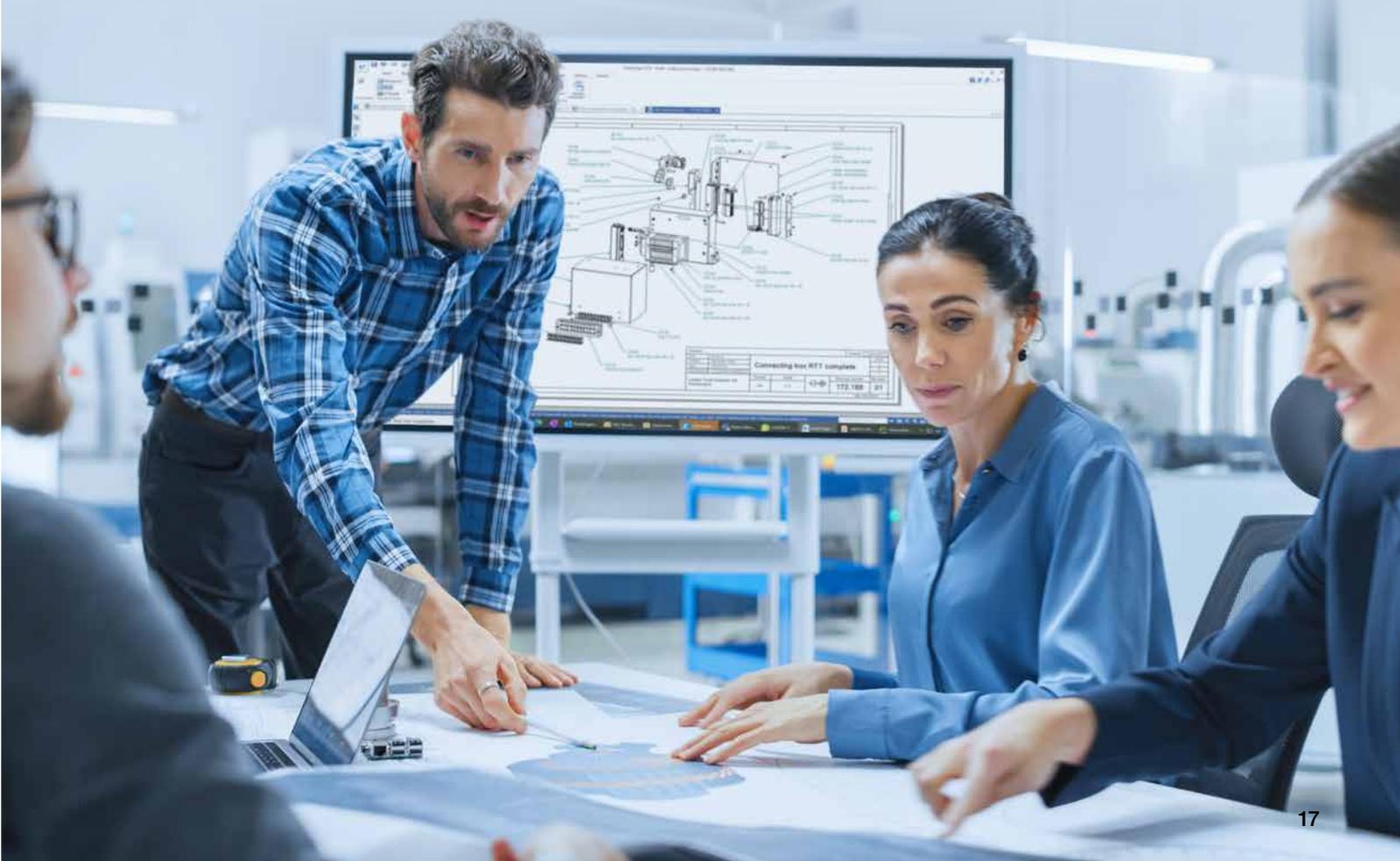
2 | Welding tests

Successful welding tests

Welding tests are decisive for the design of the welding process. The Leister application centers are equipped with modern laser welding systems to evaluate the optimal process parameters in addition to the process.

Solutions that inspire

Implementing the welding process in the production environment requires careful planning. That's why Leister project managers are involved right from the start to implement laser welding systems according to customer-specific needs and wishes.





4 | Installation and training

There for you

After delivery of the laser welding system Leister specialists will accompany you on site for configuration, installation and application training. Depending on the system type, we offer various training courses.

Worldwide service guaranteed

Regular maintenance and care of laser welding systems pay off. In addition to maintenance contracts tailored to the system, Leister offers telephone support, remote access options, spare parts and repairs.



Standalone systems

MAXI



MAXI is a modular, universally applicable laser welding system and specializes in large components. It can be equipped in many different ways as a manual workstation and can be adapted to customer-specific applications and processes.

- + Laser welding of large plastic parts
- + Optimized software for robot applications
- + Integrated online process control
- + High throughput and profitability

Technical data

Wavelength	800 – 2000 nm
Laser type	Diode laser, fiber laser
Beam guidance	Fiber coupled, direct
Laser power	40 – 600 W
Coolant Laser	Air, deionized water
Multilaser	Yes
Welding range (X-Direction)	1170 mm
Welding range (Y-Direction)	750 mm
Number of linear axis	On request
Rotatary axis	Yes
Robot	Yes
Indexing table positions	2
Clamping concept	Pneumatic, electrical
User interface	Leister HMI
Control interface	Customer specific, Ethercat, Profibus, Profinet, CAN, digital/analog I/O, OPC UA
Voltage	360 – 440 V
Frequency	50/60 Hz
Power	6400 W
Ambient temperature	10 – 35 °C
Humidity	69 % at 35 °C or 80 % at 32 °C, non-condensing
Conformity mark	CE
Laser class	Laser class 2M



NOVOLAS WS-AT



The NOVOLAS™ WS-AT is a modular, universally applicable laser welding system. It can be equipped in a variety of ways as a manual workstation and can be adapted to customer-specific applications and processes.

- + Great flexibility through simple tool changes
- + Modular laser welding machine for plastics
- + Visualization of the entire process by one software
- + Easy to integrate into existing processes

Technical data

Wavelength	800 – 2000 nm
Laser type	Diode laser, fiber laser
Beam guidance	Fiber coupled, direct
Laser power	40 – 600 W
Coolant Laser	Air, deionized water
Multilaser	Yes
Welding range (X-Direction)	400 mm
Welding range (Y-Direction)	300 mm
Number of linear axis	Max. 3
Rotatary axis	Yes
Robot	No
Indexing table positions	0
Clamping concept	Pneumatic, electrical
User interface	Leister HMI
Control interface	Customer specific, Ethercat, Profibus, Profinet, CAN, digital/analog I/O, OPC UA
Voltage	210 – 250 V
Frequency	50/60 Hz
Power	3600 W
Ambient temperature	10 – 35 °C
Humidity	69 % at 35 °C or 80 % at 32 °C, non-condensing
Conformity mark	CE
Laser class	Laser class 2M



NOVOLAS WS-AT RTT



The laser welding system NOVOLAS™ WS AT RTT is available with rotary indexing table (RTT). The RTT is an optional module that increases throughput and efficiency due to a greater cycle time.

- + Rotary indexing table increases Profitability
- + Modular laser welding machine for plastics
- + Visualization of the entire process by one software
- + Easy to integrate into existing processes

Technical data

Wavelength	800 – 2000 nm
Laser type	Diode laser, fiber laser
Beam guidance	Fiber coupled, direct
Laser power	40 – 600 W
Coolant Laser	Air, deionized water
Multilaser	Yes
Welding range (X-Direction)	180 mm
Welding range (Y-Direction)	200 mm
Number of linear axis	Max. 3
Rotatary axis	Yes
Robot	No
Indexing table positions	2 – 3
Clamping concept	Pneumatic, electrical
User interface	Leister HMI
Control interface	Customer specific, Ethercat, Profibus, Profinet, CAN, digital/analog I/O, OPC UA
Voltage	210 – 250 V
Frequency	50/60 Hz
Power	3600 W
Ambient temperature	10 – 35 °C
Humidity	69 % at 35 °C or 80 % at 32 °C, non-condensing
Conformity mark	CE
Laser class	Laser class 2M



NOVOLAS TTS



The efficient, compact laser welding device NOVOLAS™ TTS contains all necessary components for laser welding of plastics.

- + Compact and efficient laser welding system
- + Space optimized and cost-effective
- + Easy to set-up and program
- + Multiple adjustable application modes

Technical data

Wavelength	800 – 1100 nm
Laser type	Diode laser
Beam guidance	Fiber coupled
Laser power	40 W
Coolant Laser	Air
Multilaser	No
Welding range (X-Direction)	100 mm
Welding range (Y-Direction)	100 mm
Number of linear axis	2
Rotatary axis	No
Robot	No
Indexing table positions	0
Clamping concept	Pneumatic
User interface	Leister HMI
Voltage	100 – 250 V
Frequency	50/60 Hz
Power	600 W
Ambient temperature	10 – 40 °C
Humidity	80 % rel.(5 – 31 °C) linear decreasing to 50 % rel.(31 – 40 °C)
Conformity mark	CE
Laser class	Laser class 1



Integrated systems

NOVOLAS BASIC AT



The NOVOLAS™ BASIC AT welding system is designed for integration into complex production lines. Due to its consistently modular design, it can be configured very well for different requirements.

- + Flexible, modular laser welding system
- + Optimized for plastic welding
- + Several laser and optics applicable
- + Control-able via customer's control system

Technical data

Wavelength	800 – 2000 nm
Laser type	Diode laser, fiber laser
Beam guidance	Fiber coupled
Laser power	40 – 600 W
Coolant Laser	Air, deionized water
Multilaser	Yes
User interface	Leister HMI
Control interface	Digital/analog I/O, RS232, RS422/485
Voltage	210 – 250 V
Frequency	50/60 Hz
Power	3600 W
Ambient temperature	10 – 35 °C
Humidity	69 % at 35 °C or 80 % at 32 °C, non-condensing
Laser class	Laser class 4

NOVOLAS BASIC AT COMPACT



The compact, affordable laser welding system NOVOLAS™ BASIC AT COMPACT is designed for integration in production lines and production cells. It has a modular design and can be adapted to various requirements.

- + Designed for air-cooled diode or fiber laser
- + Simplified connection with quick-plugs
- + Several laser and optics applicable
- + Control-able via customer's control system

Technical data

Wavelength	800 – 1100 nm
Laser type	Diode laser, fiber laser
Beam guidance	Fiber coupled
Laser power	40 – 200 W
Coolant Laser	Air
Multilaser	No
User interface	Leister HMI
Control interface	Digital/analog I/O, RS232, RS422/485
Voltage	210 – 250 V
Frequency	50/60 Hz
Power	600 W
Ambient temperature	10 – 35 °C
Humidity	69 % at 35 °C or 80 % at 32 °C, non-condensing
Laser class	Laser class 4



BASIC S



The BASIC S air-cooled laser system is designed for integration into production lines and manufacturing cells. With its modular design, the laser system can be configured for diverse industrial requirements.

- + Optimized flexible, modular laser system for integration
- + Suitable for a wide range of applications
- + Several laser and optics applicable
- + Process parameter adjustable via display or web HMI

Technical data

Wavelength	960 – 1100 nm
Laser type	Diode laser, fiber laser
Beam guidance	Fiber coupled
Laser power	47 – 200 W
Coolant Laser	Air
Multilaser	No
User interface	Leister HMI
Control interface	TCP/IP, digital/analog I/O
Voltage	100 – 250 V
Frequency	50/60 Hz
Power	1850 W
Ambient temperature	15 – 35 °C
Humidity	69 % at 35 °C or 80 % at 32 °C, non-condensing
Laser class	Laser class 4



Selection of optics

Globo Optic



Using the Globo Optic to weld in 2-D and 3-D is possible without complex clamping technology. The air-bearing glass ball focuses the laser radiation and also serves to supply the mechanical clamping force. As the ball rolls on the component, it presses completely and locally on the joining plane. This means that the laser radiation only hits where contact pressure is present.

Roller Optic



The Roller Optic requires no additional clamping technology. With the Roller Optic a linear laser beam is guided through a glass roller, which is both the pressure tool and the last optical element. The roller, which is supported on two sides, can produce weld seam widths of about 3.0 – 6.7 mm. Due to the pendulum bearing of the roller, small irregularities in the axial direction can be compensated.

Scanner Optic



The Scanner Optic is characterized by the integrated option of movement and is mainly used for quasi-simultaneous welding. Two movable mirrors guide a spot laser beam along a programmed contour. The size of the working field can be adjusted by different focusing lenses. Like all optical components, the Scanner Optic can be installed in all Novolas™ laser welding systems.

Radial Optic



With the Radial Optic, rotationless laser welding is possible without additional clamping technology. Radial welding is suitable for rotationally symmetrical components that are difficult to rotate themselves. The laser radiation is deflected onto the circumference of the components by a conical mirror. This allows components with a diameter up to 68 mm to be welded simultaneously, which results in short cycle times and high throughput.

LineBeam



The LineBeam is the ideal beam source for mask welding. It generates a line with almost constant power density distribution, resulting in a consistent welding pattern. The LineBeam is a compact system consisting of a diode laser and directly coupled optics. The optical components of the system can be adjusted to different line lengths.

Spot Optic



The Spot Optic focuses the laser beam to a spot and is mostly used for contour welding. The focal lengths of the focusing lenses used determine the spot diameter, which in turn determines the width of the weld seam. The laser beam can therefore be adapted to the individual requirements of plastics welding by replacing optical components.

Rotation Optic

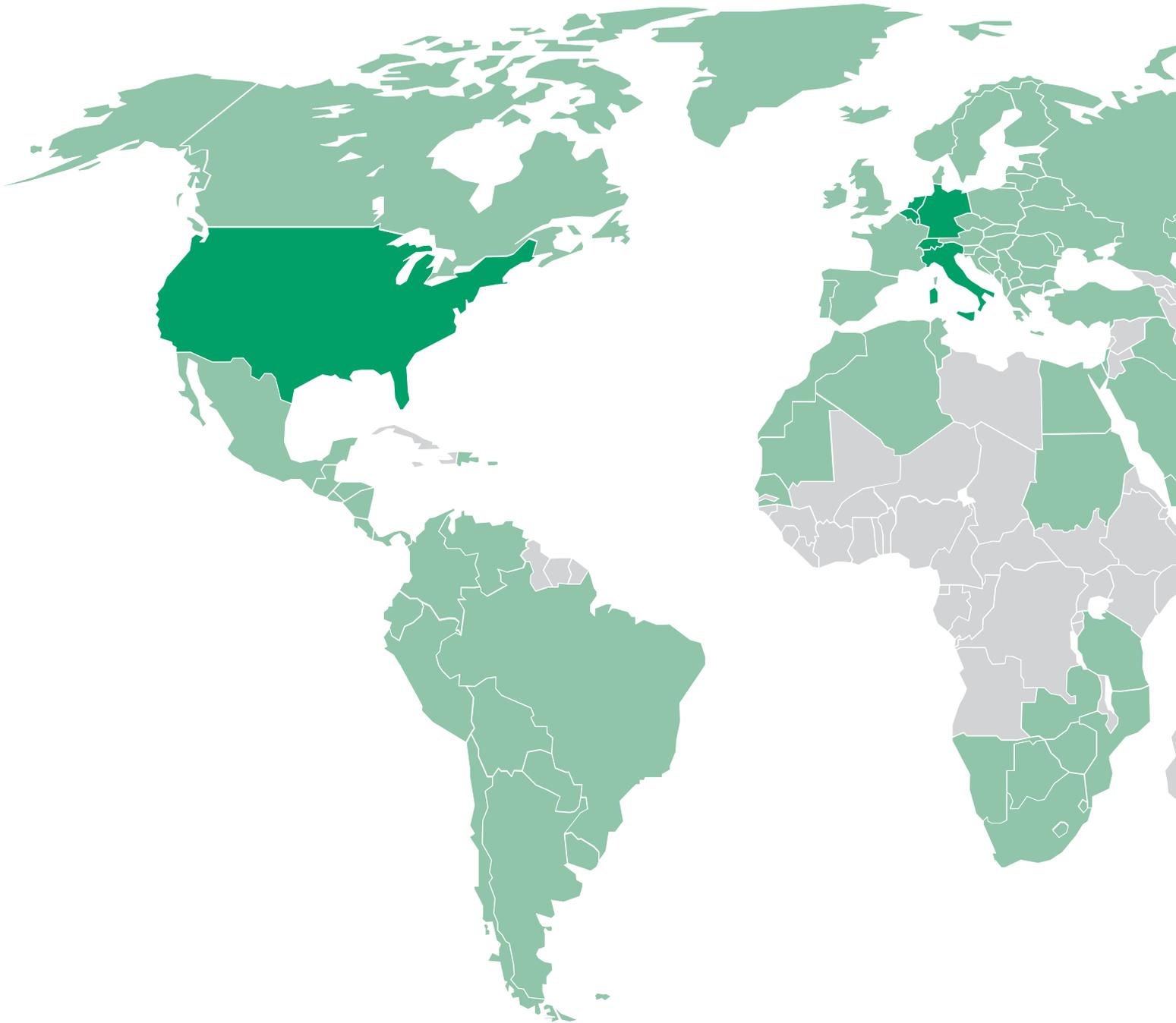


The Rotation Optic is used for sequential welding of rotationally symmetric components. It is operated exclusively with a fiber laser, which can be adjusted in different diameters via an M-shape DOE. A synchronous electric motor with hollow shaft and incremental position measuring system is integrated into the optics and moves a cantilever arm (rotor) around the component. The laser beam is deflected towards the center by an adjustable mirror at the end of the rotor.

DOE Optic



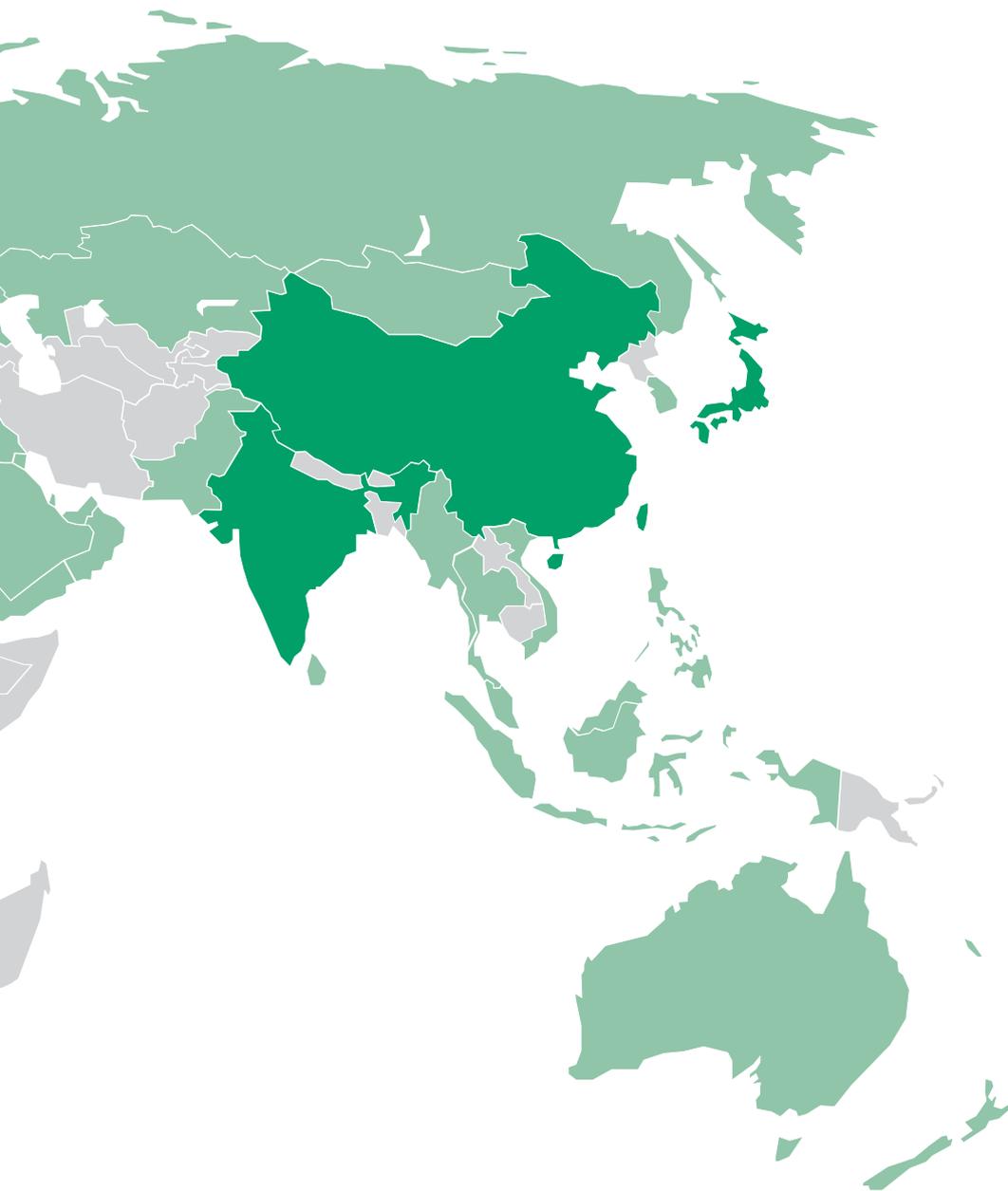
The laser beam can be individually shaped with the DOE Optic. These are also easily replaceable via the drawer system. Geometries for simultaneous welding can be generated as well as power density distributions that optimize the heat input into the plastic during contour welding. These optical systems are often used with fiber lasers to adjust the radiation to the process.



- Leister Companies
- Distributors

Our worldwide sales and service network, with 130 locations for Leister and Weldy products, ensures presence on all continents.

For decades we have been within close proximity to our customer with our national companies on three continents, our distributors and a close-meshed network of local sales partners. Leister and Weldy products are also increasingly offered in our online shops.



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We are local. Worldwide.

Our distributors are regularly trained and certified for applications, products and repairs, so that proficient service according to Leister standards is guaranteed. Our logistics hubs, as well as equipment and spare parts warehouses in all countries with a Leister representative, ensure timely deliveries worldwide.

Leister



Leister Technologies AG is an ISO 9001 certified enterprise.