Power and technology in harmony

BrightLine Weld: Perfect welding results in record time

TRUMPF

Machine tools/Power tools
Laser technology/Electronics

Low-spatter welding with TruDisk solid-state lasers and BrightLine Weld

Minimal spatter and high weld quality

Benefit from minimal spatter formation and meet high strength requirements with BrightLine Weld. Achieve high-quality welding seams and say goodbye to welding defects, such as undercuts and end craters. Distortion in the part is minimized due to the reduced energy input.

Increased productivity

BrightLine Weld increases productivity considerably with significantly higher feed rates and improved weld quality. For example, a feed rate with mild steel can be increased up to 300% (approx. 20 m/min) or stainless steel up to 100% (approx. 10 m/min).

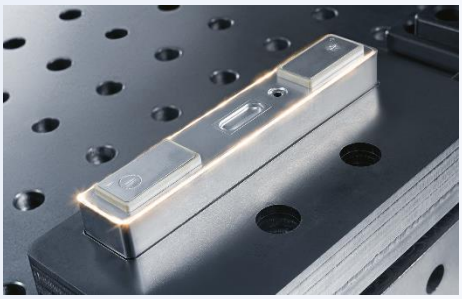
Reduced operating cost

Due to the minimal spatter formation, less debris is accumulated on the components, clamping fixtures and optics. Overall, you profit from less reworking, fewer rejects, minimized machine downtimes and a longer protective glass service life.

BrightLine Weld is suitable for a variety of materials

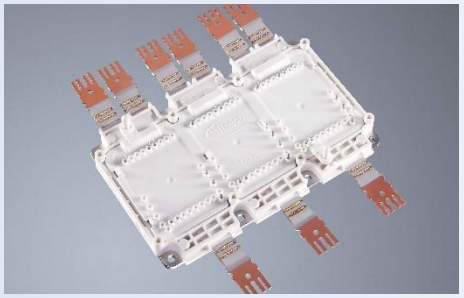
Tube and profile welding
Material: stainless steel

Hairpin welding
Material: copper

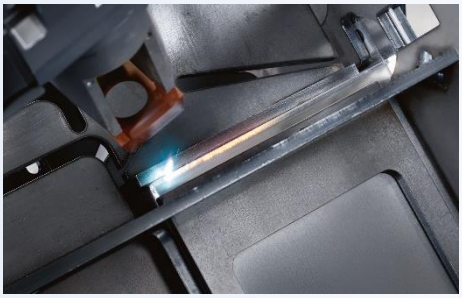


Welding a battery can cap
Material: aluminum

Welding of a gear wheel
Material: steel



Welding of power electronics
Material: copper



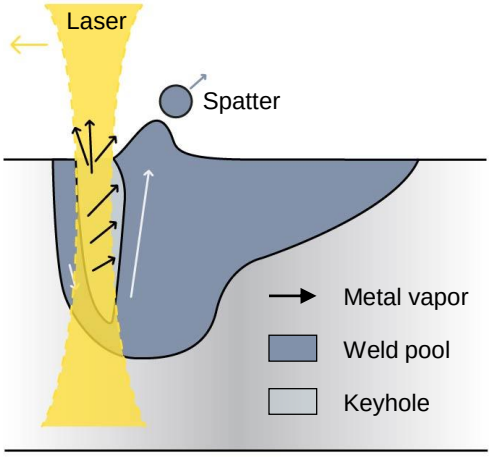
Welding a battery tray
Material: aluminum 6000

- Available laser power of TruDisk with BrightLine Weld: 1 kW to 16 kW
- Available fiber diameter (fiber core/fiber ring): 50/200 µm, 100/400 µm, 200/700 µm

Welding without BrightLine Weld

Causes of spatter

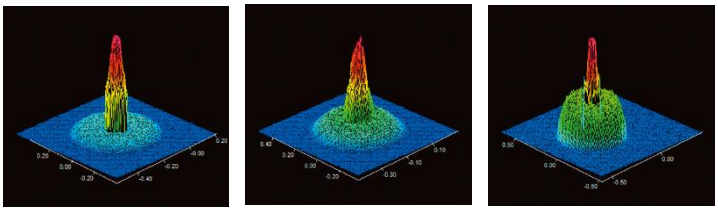
- Metal vapor formed during keyhole welding exhausts up through the melt pool
- The metal vapor causes the molten metal at the rear of the keyhole to accelerate upward
- Due to the high acceleration, the molten metal escapes the keyhole in the form of spatter particles



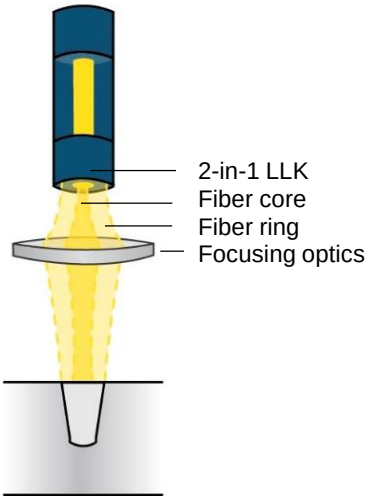
The patented TRUMPF 2-in-1 fiber (LLK)

Flexibility is the key to success

- The use of patented 2-in-1 fiber (LLK) enables BrightLine Weld technology
- Laser power is easily adjusted to vary distribution in the fiber core and fiber ring
- Adjustment of power distribution optimizes application results



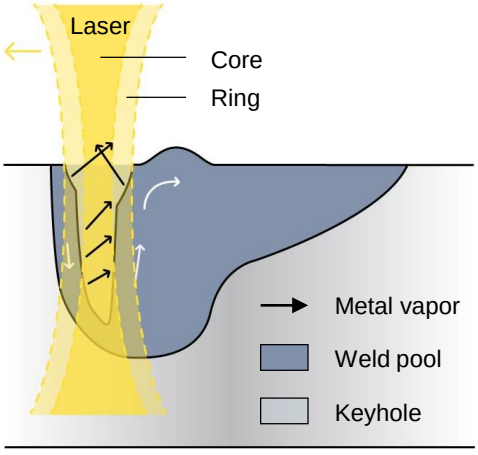
BrightLine Weld intensity distribution in focal plane:
Increasing laser power in the fiber ring (left to right figure).



Welding with BrightLine Weld

Proven results in spatter reduction

- The addition of a second concentric ring shaped core around the primary center core enlarges the top of the keyhole opening
- Metal vapor can escape more easily through the larger opening thus reducing the pressure/acceleration on the melt pool on the rear of the keyhole
- The removal of the pressure allows for a more stable and calm weld pool behind the keyhole
- Result: no spatter



Flexible use

Different processing modes for maximum application flexibility:

- Welding with 100% laser power in the fiber core
- Welding with 100% laser power in the fiber ring
- Flexible distribution of laser power between the fiber core and fiber ring

Modular design

- BrightLine Weld: Standard solid-state TruDisk laser with a BLW module and 2-in-1 fiber (LLK)
- Retrofit option of BrightLine Weld available in the field
- Quick and inexpensive qualification for the new welding technology

Plug-in laser light cable (LLK)

- Guarantees a quick and simple change for maximum production reliability
- No fiber alignment necessary

Maximum utilization

- Use of up to 5 outputs with BrightLine Weld possible on the same laser
- Increased utilization of the laser and reduced part costs
- Increased laser availability thanks to the intelligent redundancy concept

Simple programming

BrightLine Weld Basic

- Power distribution setting in TruControl
- Adjustment range: 10% to 90% share of power in the fiber core at 1% increments

BrightLine Weld Professional

- Contains welding curves for different materials and setups
- Start value recommendations for the optimum power distribution and focus position
- Quick run-in of new welding processes
- Weld new materials easily

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