

# BRAZING



# LASER meets METAL

**M**odern fiber-coupled diode lasers allow for brazing and welding with filler wire in a very economic way – at process speeds of several meters per minute. With this technique, the filler wire is molten in the joint area, which, through diffusion effects, results in firm, durable bonding of the sheet metal parts.

When welding aluminum parts, the filler wire introduces additional material into the weld, which prevents embrittlement of the material. The diode laser is used with special laser processing heads equipped with tactile or optical sensors. This set-up guarantees for a very precise brazing process.

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## UNMATCHED IN APPLICATION

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Because of the low heat input, the corrosion protection of galvanized sheet metal remains uncompromised even in the joint area, and the components show extremely low distortion. This, and the excellent surface quality, is the reason why the sheets can be painted directly after brazing without any further treatment.



## TOP SIX ■■■■■■

- Excellent surface quality at high processing speed
- Superb process stability
- High process reliability and power consistency
- Superior cost effectiveness compared to other laser types
- High reliability for serial production
- Low space requirements and mobility facilitate new equipment concepts

LAS  
me  
ME



Unmatched welding surface:  
Brazing with diode lasers.

LAS  
me  
ME

## BRAZING – DIODE LASERS STAND FOR: FLEXIBILITY AND COST SAVINGS

SER  
ets  
TAL

The newest generation of laser technology:  
Integrated head of a fiber-coupled diode laser.



Use of the diode laser in production:  
Quality and speed.

# SER ets TAL



fiber-Ø	min. focus at f = 200 mm	typical output power
400 µm	0.8 mm	1,000 W – 4,000 W
600 µm	1.2 mm	1,000 W – 6,000 W
1,000 µm	2.0 mm	2,000 W – 8,000 W
1,500 µm	3.0 mm	2,000 W – 8,000 W

**N**owadays, brazing heads from most manufacturers are also designed for diode lasers, and process parameters are easily transferrable from old laser systems to diode lasers. This means that replacing old laser systems with diode lasers can easily be done at any point in the machine life cycle.

The typical process requirements of the beam source for laser brazing are: Output power of up to 8,000 W, a focus spot size of 1.5 to 3.5 mm and a homogeneous intensity distribution. Laserline diode lasers provide this in an ideal format.

## BEAM SOURCE FOR LASER BRAZING

The diode laser is the most cost effective beam source for brazing and welding with filler wire, not only due to the best efficiency of all laser types, but also because of the low maintenance requirements resulting from the long lifetime of the laser diodes and because of the compact packaging of the system.

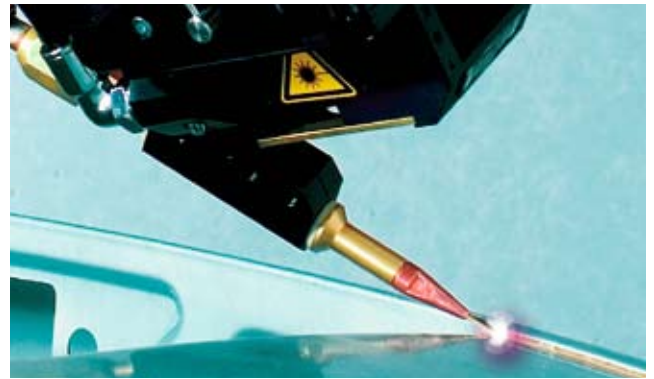


LIGHT  
GOES  
DIODE

## BRAZING

**B**razing – and the related process of welding with filler wire – are modern techniques for the joining of metal components. In addition to the requirements of high strength and a small heat affected zone, particularly high demands are made on the appearance of the weld seam in the case of visible seams. Therefore, in the automotive industry, laser brazing is used for joining the visible, external parts of vehicles, for example tailgates, roof seams, doors or C pillars.

Greatest process stability and high availability of equipment in three-shift production are requirements in the automotive industry which are ideally met by the diode laser that is considered proven technology in many applications.



The diode laser is clearly superior to other laser beam sources because it is almost maintenance-free with a lifetime of more than 30,000 operating hours and excellent efficiency. As a comparison: Lamp pumped Nd:YAG lasers require lamp changes by trained maintenance personnel approximately every 1,000 operating hours, resulting in considerable down time.

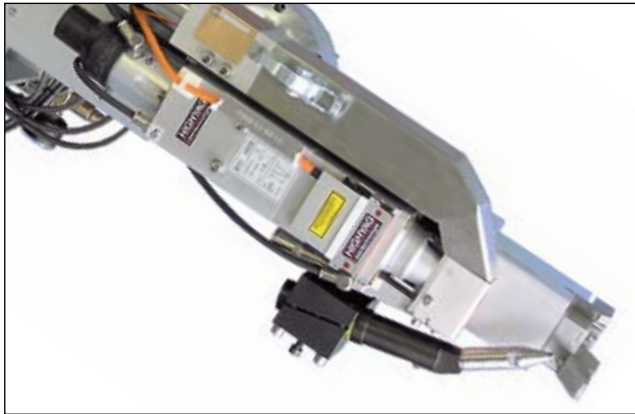
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### ALWAYS A STEP AHEAD: DIODE LASERS

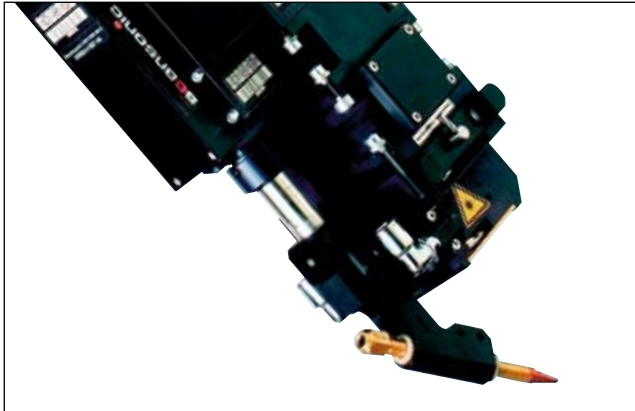
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Increasingly, floor space reduction has become a must when designing new production lines. One advantage of diode lasers is their small footprint, which is only about a fifth of the footprint of other lasers in the same performance class. Being compact and robust allows for the diode lasers to be mobile, enabling entirely new backup strategies. For maintenance work or in the case of a malfunction, the laser can simply be exchanged and replaced. Maintenance or repair now can take place in the maintenance area instead of on the production line, not causing production stoppages and enabling a more flexible approach to service by either the customer or Laserline service personnel.

In brazing and welding with filler wire, Laserline fiber-coupled diode lasers are applied in conjunction with brazing heads of all established manufacturers.



Brazing head for fiber-coupled diode lasers



Brazing head with auto focus and seam tracking



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